the

Journal

of the association for physical and mental rehabilitation

CORRECTIVE THERAPY

JULY - AUGUST, 1961 VOL. 15, NO. 4

THE *New* PRESTON STANDING TABLE

Preston Catalog Number PC 7194-U

This newly developed Standing and Treatment Table is manually operated by means of a hand crank. The sturdy base, constructed of angle iron, has a brown enamel finish. The table top is 24" wide; 78" long; 32" high, and is upholstered with durable waterproof leatherette.

features . . .

EASE OF OPERATION — A special worm and gear arrangement permits tilting the table with minimum effort. The crank handle is near the top, obviating the need for the therapist's bending.

TILTS FROM HORIZONTAL TO VERTICAL position (from 0—90 degrees). Locks automatically at any desired angle.

EASY PASSAGE through narrow doorways and corridors.

EASY TRANSFER of patient from bed or stretcher to table. Height of top—32" from floor.

EASILY MOVED with its four large 4" ball bearing swivel casters, two of which have step-on brakes.

COMFORT TO PATIENT is assured by upholstery top of durable waterproof leatherette. Footboard has a non-slip surface. Two heavy-duty restrainer straps hold patient securely on table. Square rails on each side of table permit placing restrainer straps or auxiliary equipment in any desired position.

PROTRACTOR to indicate degree of tilt from 0 to 90 degrees.

STORED IN SMALL PLACE —Requires only 29" x 44" for storage, with top in vertical position.

ONE YEAR GUARANTEE AGAINST DEFECTS IN MATERIAL OR WORKMANSHIP

THE *Only* QUALITY TABLE AT AN *Economy Price!*

Designed for EASE OF OPERATION, COMPLETE SAFETY and SIMPLICITY, with a resultant LOWER PRICE THAN COMPARABLE UNITS.

CATALOG NO.

PC 7194-U Standing Table, including Upholstered Top. Complete with 4" casters and two Restrainer Straps

PC 7195S Additional Restrainer Straps 7.50

Prices F.O.B. New York, N. Y.

Send all orders directly to

$245

J. A. PRESTON CORPORATION

71 Fifth Avenue, New York 3, New York

The Journal of the Association for Physical and Mental Rehabilitation
JULY – AUGUST, 1961

VOLUME 15 NO. 4

Published Bimonthly
by the Association for
Physical and Mental Rehabilitation
105 St. Lawrence Street
Rehoboth Beach, Delaware

in this issue

EDITORIAL BOARD

John E. Davis, Sc.D. ..... Rehoboth Beach, Del.
Edward D. Greenwood, M.D. ..... Topeka, Kans.
Richard L. Jenkins, M.D. ..... Washington, D. C
Lewis A. Leavitt, M.D. ..... Houston, Texas
Jack Meislin, M.D. ..... Montrose, N. Y.
Carl Haven Young, Ed.D. ..... Los Angeles, Calif.
Arthur H. Steinhaus, Ph.D. ..... Chicago, Ill.

EDITORIAL STAFF

EDITOR
Roger H. Wessel
Box 478, Montrose, N. Y.

EDITOR EMERITUS
Everett M. Sanders
So. Sudbury, Mass.

ASSOCIATE EDITORS
Marthann Doolittle
Thomas J. Fleming
J. Robert Macaluso

CONTRIBUTING EDITORS
Thomas K. Cureton, Ph.D., Urbana, Ill.
Ernst Jokl, M.D., Lexington, Ky.
Peter V. Karpovich, M.D., Springfield, Mass.
Dana M. Street, M.D., Memphis, Tenn.
Raymond A. Weiss, Ph.D., New York, N. Y.
William R. Pierson, Ph.D., Los Angeles, Calif.

DEPARTMENT EDITORS
BOOK REVIEWS AND ABSTRACTS
Philip J. Rasch, Ph.D.

CHAPTERS
Frank Deyoe

PRODUCTION EDITOR
Harold McCormick

CIRCULATION MANAGER
William Kultzow

ADVERTISING MANAGER
John J. Marquette
66 Stone Ave., Ossining, N. Y.

SUBSCRIPTION RATES
Subscription to the Journal is included in Active, Professional, and Associate memberships.
Subscriptions to libraries and organizations $5.00
Foreign $5.50
Single Copies $1.00

Address all requests for subscriptions to:
Circulation Manager,
Box 478, Montrose, N. Y.
Copyright 1961 by the Association for Physical and Mental Rehabilitation

ARTICLES

The Ideal Diet and Nutrition Today—Everett W. DeLong, M.D. 99

New Techniques of Athletic Training and Conditioning (Part 2) — Thomas Kirk Cureton, Ph.D. 103

Determination of the Resistance Load for 1-RM and 10-RM — Richard A. Berger, Ph.D. 108

Social Motivation of Catatonics — Geraldine L. Hoseason, M.S. 111

New Directions in Weight Training and Athletics —William R. Pierson, Ph.D., F.A.C.S.M. 114

DEPARTMENTS

FROM OTHER JOURNALS 116

STUDENTS' CORNER 118

CHAPTER ACTIVITIES 120

BOOK REVIEWS 120

NEWS AND COMMENTS 124

CLASSIFIED DIRECTORY ..... Back Cover

THE JOURNAL OF THE ASSOCIATION FOR PHYSICAL AND MENTAL REHABILITATION

Information For Contributors

MANUSCRIPT: Manuscripts should not exceed ten (10) typewritten pages; approximately 5,000 words. Manuscripts must be the original copy, not a carbon, typed double-spaced with margins of one (1) inch for large type and one and a half (1½) inches for the small.

STYLE: Prepare manuscripts in conformity with the general style of the Journal. Retain a copy of the manuscript and duplicates of all tables, figures, charts for future use should originals be lost in the mails.

ILLUSTRATIONS: Drawings and charts should be made with India ink for photographic reproductions as zinc etchings. Photographs must be 8 x 10 inches, high contrast, black and white, glossy prints. Printed captions and related information referring to photographs, must be typed and attached to the bottom of the photograph. In accepting an article for publication the association agrees to defray the costs of one (1) photo engraving or line cut used for illustration purposes. Cost of additional engravings must be charged to the author.

REFERENCES: References in the text should be identified by number, *i.e.*, "As Observed by Kendall and Jones (4). All references should be listed at the end of the article in numerical sequence. The following order and punctuation should be observed: Kendall, B.S. and J.E. Jones, Resume of Treatment of Brain-Damaged Cases. *Arch. Neurol. and Psychiat.*, 71:247, June, 1948.

Send all manuscripts to the Editor, Box 478, Montrose, N. Y.

REPRINTS: Should be ordered when manuscript is submitted. They may be purchased at the following prices:

No. Pages	100	200	300	400	500	1 M	100 Add.
1	$ 8.15	$ 9.70	$10.95	$12.20	$13.45	$18.75	$ .95
2	11.55	13.15	14.70	16.25	17.80	24.70	1.25
3 - 4	14.70	16.90	19.05	21.25	23.15	32.50	1.90
5 - 8	28.15	32.15	44.40	50.65	56.90	81.25	5.00

REPRESENTATIVE ASSEMBLY

Eastern States—Leo Berner, 21-02 67th Ave., Bayside, N. Y.

West N. Y.—Warren N. Landon, 22 So. Main, Manchester

Mid Atlantic—George M. Kilmer, V.A.H., Ft. Howard, Md.

Mid-West—Leslie M. Root, 2142 N. 61 St., Wauwatosa 31, Wisc.
Carl Peterson, 4728 N. Virginia, Chicago 25, Ill.

Northwest—Samuel G. Hewston, V.A.H., American Lake, Wash.

Calif.-Nevada—Bernard H. Weber, 7631 Willis Ave., Van Nuys.

Evangelo Gerontinos, 1781 Bogan Avenue, Mountainview.

Ernest G. Saenz, 5214 Selmaraine Dr., Culver City.

Central States—George Jurcisin, V.A.H., Chillicothe, Ohio.

New Eng.—George Heos, Box 256, Astor Station, Boston 23, Mass.

So. East—John Bozovich, VA Hospital, Bay Pines, Fla.
Paul B. Bell, 1143 Getwell, Memphis, Tenn.
William Redden, V.A.H., Lake City, Fla.

Texas-La.—John J. Arena, 5037 Rapido St., Houston 21, Texas.

Ht. of America — Robert O. Swengel, 2605 Murrow Ct., Topeka, Kans.

Grand Canyon—Henry White, 2142 Terra Suida Drive, Salt Lake City, Utah.

OFFICERS

RICHARD G. FOWLER — PRESIDENT
3586 Tilden Ave., Los Angeles 34, Calif.

DAVID SER — PRESIDENT-ELECT
4301 46th St., Long Island City 4, N.Y.

JULIAN VOGEL — VICE PRESIDENT
V.A. Hospital, Waco, Texas

LESTER P. BURROWES — VICE PRESIDENT
Box 146, Clinton, Miss.

EDWIN D. JONES — VICE PRESIDENT
V.A. Hospital, Tuskegee, Ala.

JOHN B. MURPHY — SECRETARY
Rte. No. 3, Chillicothe, Ohio

VINCENT ODDO — TREASURER
4839 W. Dakin, Chicago 41, Ill.

ROGER H. WESSEL — EDITOR OF JOURNAL
Box 478, Montrose, N.Y.

CARL HAVEN YOUNG, Ed.D. — PAST PRESIDENT
3231 Coolidge Ave., Los Angeles 66, Calif.

JOHN E. DAVIS, Sc.D. — EXECUTIVE DIRECTOR
105 St. Lawrence St., Rehoboth Beach, Delaware

HARRY B. DANDO — CHM., CERTIFICATION COMM.
1092 Fairmont St., St. Paul 5, Minn.

ADVISORY BOARD

JOHN E. DAVIS, Sc.D., Secretary

JOHN H. ALDES, M.D. — Los Angeles, Calif.
RUFUS ALLDREDGE, M.D. — New Orleans, La.
FOLKE, BECKER, M.D. — Dublin, Ga.
THOMAS K. CURETON, Ph.D. — Urbana, Ill.
TEMPLE FAY, M.D. — Philadelphia, Pa.
EVERILL FOWLKS, M.D. — Portland, Ore.
FRITZ FRIEDLAND, M.D. — Boston, Mass.
EDWARD GREENWOOD, M.D. — Topeka, Kans.
HAROLD M. HILDRETH, Ph.D. — Arlington, Va.
A. B. C. KNUDSON, M.D. — Washington, D. C.
MELVIN J. MAAS, Maj. Gen. USMCR Ret. — Washington, D. C.
KARL MENNINGER, M.D. — Topeka, Kans.
DONALD MUNRO, M.D. — Boston, Mass.
LOUIS B. NEWMAN, M.D. — Chicago, Ill.
WINTHROP M. PHELPS, M.D. — Baltimore, Md.
HARVEY J. TOMPKINS, M.D. — New York, N. Y.
JOSEPH H. VAN SCHOICK — Washington, D. C.
STAFFORD L. WARREN, M.D. — Los Angeles, Calif.

COMMITTEES AND CHAIRMEN

COORDINATOR: David Ser

STANDING COMMITTEES: AWARDS: George V. Devins; CERTIFICATION: Harry Dando; CHAPTERS: Frank S. Deyoe; CONFERENCE: Paul E. Roland; CONSTITUTION: Harlan C. Wood; MEMBERSHIP: Bernard H. Weber; NOMINATION: Carl B. Peterson; PROFESSIONAL STANDARDS: Arthur Landy; PUBLIC RELATIONS: David Ser; SCHOLARSHIP: Carl H. Alsberg; EDUCATION: Ivan W. Swisher, Ed.D.

ADMINISTRATIVE COMMITTEES: ADVERTISING: John J. Marquette; EXHIBITS: Bernard H. Weber; LEGISLATIVE: George W. Jones; LIAISON: John J. Arena; POSITION STANDARDS: Zane E. Grimm; PLACEMENT: Julian Vogel; RESEARCH: Oscar H. Ciner, Ed.D.; STANDING COMMITTEES: Daniel Bennett; SALARIES: Everett G. Converse; BIBLIOGRAPHICAL: Frances Bascom, Ph.D.

THE IDEAL DIET AND NUTRITION TODAY*

Everett W. DeLong, M.D.**

Is there an ideal diet? Are there nutritional *truths* or *facts* or *practices,* the application of which will solve most of our problems in therapeutics and disease prevention? Unfortunately, the answer is *no.* The concept of an ideal diet or the notion that somewhere or somehow the "truths" of nutrition are subject to compilation is literally a pre-scientific concept or notion that has no place either in medicine or in an age that has already seen the disappearance of other illusory absolutes in the dynamic and relativistic processes that we today recognize as comprising modern science.

Like the concepts of time and space, the modern concept of adequate nutrition is relativistic. If we can fix this central fact in mind it will do much to dispel the confusion and the apparent contradictions that we see all about us in the field of nutrition. There are those, of course, who extoll the high protein diet as *the* ideal diet; there are others who are equally enthusiastic over low protein diets; others who stress the value of high carbohydrate diets; others who find the meatless diet, the milkless diet, the breadless diet, the fruit diet, the fruitless diet, and countless other types of diet to be, in their opinion, *the* ideal diet.

Confronted with such apparent confusion and contradictions is it any wonder that many medical men and others abandon the science of nutrition in despair? However, these *apparent* contradictions are only contradictions in reality if we choose to look at them as such. The fact is that there is no one ideal diet or one ideal system of nutrition that can apply to all; nor is there any ideal diet or system of nutrition that can apply to any individual at all times. *There are only relatively satisfactory diets and systems of nutrition applicable to each individual at a given time and under given conditions.*

With this fact in mind we see the objective of adequate nutrition as an ever-changing one. But despite the dynamic nature of our nutritional requirements as individuals there is a common and more or less fixed pivotal area for the nutritional requirements of us all. According to our weight, or the surface area of our bodies, and the work we do, each of us requires a minimum number of calories, a minimum quantity of water, minerals, and vitamins.

Our caloric intake may be drawn from a wide combination of fats, carbohydrates, and proteins. Our bodies are capable of rather extreme adaptation in this manner of caloric intake. Human beings have been able to maintain themselves in relatively good health for relatively long periods of time drawing solely upon carbohydrates, or upon protein alone, or fats alone for their daily caloric needs. Even in the case of vitamins it is quite remarkable to observe the extreme flexibility of the organism in adjusting to profound vitamin deficiencies over relatively long periods of time. Often austere diets are deficient in vitamins and we find some of the deficiency being compensated for through the biosynthesis of vitamins by intestinal bacteria.

The ability of man to survive extreme qualitative limitations in his diet has contributed to a strong but unjustified agnosticism toward nutritional therapy on the part of many. After fully recognizing the truly remarkable ability of the organism to adapt itself to the widest extremes in dietary deficiencies for purposes of survival, we are still left with the fact that there is an organism to be nourished and that there is a poor way to nourish the organism, a fair way to do it, and an excellent way.

To draw from what I have said so far the conclusion that too many others have drawn from these facts — that the quality or quantity of nutrition, after all, does not matter much, is as sensible as for one to conclude that because an excellently constructed automobile can manage to run with the poorest grade gasoline, with the worst grade oil at a dangerously low level, over the roughest roads on the testing ground that one, therefore, is justified in ignoring the quality of fuel and oil one puts into such a car and can ignore the roughness of the roads one travels with it.

The life of such a car is going to depend upon (a) the quality of the fuels with which one provides it, and (b) the care with which one drives it. The life of the human organism has a similar dependence. It is fine that the good machine and the strong organism are both capable of sustaining long periods of abuse in terms of poor fueling and rough handling. But what would we think of the intelligence of a neighbor who ran his new car on kerosene and crank-

---

*Presented at Third Tri-Organizational Clinical and Scientific Conference, Santa Monica, Calif., June, 1960.

**Beverly Hills, Calif.

case flushings and generally abused it because he read somewhere that another car of the same make was similarly abused and still ran after 100,000 miles? Would we not consider such a person a moron at the very best? Is it any greater evidence of common sense for someone to advance the hackneyed argument that because his father or grandfather, or someone else, "drank and ate anything and smoked all the time" and lived to be 90 others can safely follow the same course and hope for the same life-expectancy?

It would be presumptuous for me to reiterate here the importance of the so-called "balanced diet"—balanced in carbohydrates, proteins, fats, vitamins and minerals. Reliable information in this area is now almost universal so far as generally applicable nutritional principles are concerned. Little need be added here on the subject of general nutritional supplementation, the use of supplementary vitamins and minerals for so-called maintenance purposes.

But beyond the minimal and generally applicable requirements of nutrition to which I have very briefly alluded are the more specific or individualized nutritional requirements which are consciously or unconsciously the vital concern of each of us. Each of us has his own ideal nutritional requirements at each period in his life, and if we examine these requirements sharply enough we find that they are as individualized as are our own fingerprints. Just as there are no two persons in the world who have identical fingerprints, so there are no two persons in the world who have identical nutritional requirements. While the pattern of one's fingerprints is fixed for life, the pattern of one's nutritional requirements, while distinctive to each person, is not fixed for life but varies from day to day and even from hour to hour. The scientific reason for this variability is now well understood, and we shall come to that briefly.

This individualization in food requirements is something with which we are ordinarily concerned after the basal dietary requirements in carbohydrates, proteins, fats, vitamins, minerals, and water common to us all are satisfied. The person suffering from a gross deficiency in vitamins or from protein starvation is, for example, first provided with the basal dietary requirements before the individualization of his diet can be rationally established. It is when basic requirements are met that each of us is concerned with the proper nutritional individualization or selection.

The variation in specific food needs found among different individuals, or for the same individual at different times, ranges from the frank food idiosyncrasies or allergies shown by one individual or another toward almost every kind of food, to the mild or strong preferences each of us shows for different foods at different times of the day or year.

Each of us has specific requirements as unique or personal as his fingerprints and his genetic composition. Each has a combination of genes quite different from anyone else in the universe which is responsible for an individual composition of protein molecules subtly different from those protein molecules comprising any other living entity on earth. As a result of our genetic patterns we are composed not only of unique proteins but of enzyme systems and metabolic pathways that are unshared by any other living entity besides ourselves.

As a result of metabolic uniqueness or individuation each of us has a slightly different way of handling foods. There are in extreme cases some food elements that some of us cannot properly assimilate at all because of what Sir Archibald Garrod, an Oxford biochemist and physician, in 1908 described as "inborn errors of metabolism." As an example of this, Garrod cited alcaptonuria, the chief symptoms of which is the blackening of urine when exposed to air. This condition is due to the abnormal handling of the amino acid tyrosine with the production of an excess of the pigment known as melanin. A fuller understanding of this concept was achieved in the late 1930's when Beadle and Tatum of Stanford experimentally nailed down the "one-gene one-enzyme hypothesis" and showed that the genes of cell nuclei act through integrated enzymes to determine the metabolic patterns of the cell. Thus a gene differing in composition and location from the average because it is linked with an enzyme system involving tyrosine so affects the metabolism of the amino acid tyrosine as to result in the production of urine that is black in color.

This is admittedly an extreme example of metabolic individualization. The more common examples of such individualization are found universally. There is the individual who cannot tolerate crab meat, another who is sensitive to strawberries, another who cannot eat eggs, another who is sensitive to all dairy products, another who is sensitive to egg yolk but not egg white — the list is endless. These sensitivities are very real. It is not enough to dismiss them with the phrase "food allergy." That phrase does not explain the mystery but merely hangs a different label on it.

It is fortunate, however, that these genetically determined "inborn errors of metabolism" are not as

a rule unchangeable. They are subject to varying degrees of modification.

In adjusting ourselves to a dietary pattern as nearly ideal in terms of our own requirements as we can get, our primary reliance must be on ourselves. The science of nutrition is far too primitive to permit any comprehensive determination of the specific food requirements of an individual by any means other than the individual's own ability to select those specific foods most agreeable to him, those foods he finds most appealing, that satisfy him most, and leave him feeling most fit after ingesting them.

To exercise such necessary dietary discretion the individual must have the necessary tools. These comprise *simple,* pure unadulterated and unprocessed natural foods. The reason for this is clear. If the individual is sensitive to milk or eggs, he can ill afford to ingest mixtures of complex processed foods containing both. If he is sensitive to crab, he is going to be sensitive to anything containing crab meat. Obviously, the individual is not free to exercise his normal and indwelling sense of dietary discretion if foods are artificially so mixed and prepared that one type of food cannot be separated from another. The same generalizations apply to food additives.

In speaking of "inborn errors of metabolism" I do not want to leave the impression that food allergies, idiosyncrasies, and preferences are by any means all genetically determined. They are not. There are many food allergies that clearly arise as classical immunological phenomena involving the development of specific antibodies to specific food proteins. One's immunology is, of course, genetically conditioned. Then there are, it is true, food preferences that are culturally determined.

Since, ideally, all proteins are broken down in the intestinal tract to an assortment of simple amino acids prior to intestinal absorption, and all carbohydrates are ideally broken down in the same place to simple sugars, and all fats to glycerine and simple fatty acids, one might wonder why the original nature of these proteins, carbohydrates and fats is of particular consequence in the diet. Unfortunately, the described breakdown is not always complete. Sometimes protein segments called polypeptide chains pass through the intestinal wall into the blood and lymph prior to complete breakdown into amino acids and sometimes certain carbohydrates are absorbed prior to their complete hydrolysis to simple sugars. It is these unbroken segments of protein and polysaccharide molecules that pass into the blood and lymph from the intestine that are responsible for our sensitivity to many foods.

Such food sensitivities tend to appear at all ages but are increasingly common with the advancing years. With age, the enzymatic action of the pancreas gland gradually declines and there is an associated failure in the complete enzymatic hydrolysis of proteins, carbohydrates and fats by the organism. For this reason the supplementary use of adequate oral pancreatic enzyme extracts is so important to the health of many people. The enzymatic activity or potency of such extracts must be sufficiently high to break down the proteins, fats and carbohydrates completely prior to their intestinal absorption.

With our advancing knowledge of nutrition the role played by the pancreatic enzymes looms ever larger. We now know that their action is not limited merely to the gut but that these enzymes pass into the blood stream and there afford another line of enzymatic defense by digesting foreign protein, carbohydrate or fat particles arising through faulty digestion or otherwise.

In our consideration of the capacity of the organism to adapt itself to variations in the quality and quantity of food available to it, we very often overlook what has for ages been one of the major caloric components of the diet. This is alcohol. Alcohol produces about 7 calories per gram as contrasted with the 4.1 calories per gram produced by proteins and carbohydrates and the 9.3 calories produced by fats. The amount of alcohol ingested varies from person to person and country to country. It is probably highest in France, where the average consumption by males is 1.5 liters of wine daily. The average Frenchman derives a little over 1,000 calories daily from wine, which is about one-third the caloric requirement of the sedentary worker.

Alcohol utilizes metabolic pathways somewhat different from those normally utilized in carbohydrate metabolism. Despite its prominence in many diets, nutritionists and biochemists have tended to overlook the role of alcohol in human metabolism. There is no question that it contributes greatly to the acetate pool of the body. The body is naturally endowed with specific enzymes, such as the alcohol dehydrogenases, to metabolize dietary alcohol. How much if any alcohol is desirable as part of the diet is still a scientifically unresolved question. Our lack of knowledge in this important area of nutrition is profound and it is a counsel, indeed, to humility. I believe, for example, that the people you will find least disposed to dismiss the ingestion of vinegar and honey as a useless notion are the biochemists and nutritional scientists who know something about the role of methyl and ethyl radicals in animal metabolism. Is

it impossible that vinegar or acetic acid supplies some of the metabolically useful acetates, in a less offensive way, than they are supplied by alcohol? I do not know. The facts are yet to be determined. But ever since the redoubtable Morris Fishbein twenty years ago assured us in orthodoxy that no bread was really better than super-refined white bread, I have made it a practice to underline the question marks on our ignorance and not confuse our ignorance with omniscience.

We have mentioned that the organism is capable of handling alcohol. It is also capable of handling one of the most poisonous substances in nature: hydrogen cyanide. It is provided with special enzymes for this purpose; these are called *rhodanase* enzymes. They convert active cyanide into harmless thiocyanates. Some of our most important foodstuffs such as lima beans and peaches contain traces of cyanide-bearing sugars. These sugars are important to our welfare, and I believe that in time they will be classified as vitamins. I have had occasion to do considerable clinical research on these substances. They are most fascinating.

I trust that the lack of dogmatism characterizing our attitude will not be misinterpreted as a form of nutritional nihilism. This is the last impression I wish to leave. I would say categorically that scientific nutrition comprises the single most useful and valuable modality in medicine. Clinical medicine may be divided into three categories: (a) the nutritional or biochemical, (b) the mechanical or surgical, and (c) the pharmacological. Of these three, the nutritional or biochemical one is the most important. The mechanical or surgical modality, aside from the repair of obvious injuries, is one to which we resort with decreasing frequency as we learn more about nutrition. The pharmacological category is concerned, of course, with drugs. All drugs are divisible into two groups: those that stimulate function and those that depress function. The science of nutrition minimizes the need for drugs. Granting the merciful quality of the opiate derivatives under certain emergencies and the unquestioned value of the antibiotics in infections, scientifically adequate nutrition minimizes the need for even opiates or antibiotics by keeping the organism healthy.

Let me give you a categorical statement on medical therapy that you may take with you: No chronic disease has ever found resolution except through nutritional means, nor is the resolution of any chronic disease ever likely except through nutritional means. Beriberi, pernicious anemia, scurvy, pellagra, certain forms of heart disease, polyneuritis—these are only a few of the once fatal chronic diseases that have found their resolution in nutritional science.

In this short discussion I have accomplished my purpose if I have served to dispel just a bit the confusion so many have developed as a result of seeking this or that ideal or absolute resolution of nutritional problems in a single type of diet, in a single or limited philosophical system in nutrition, or in a single "wonder food" or even in a combination of "wonder foods." In attending meetings and conventions held by nutritional societies some may be confused by the seemingly endless variety of specialized nutrients and by the sometimes seemingly contradictory theories advanced. Most of this confusion, I believe, derives from the fact that we still are inclined to approach the problem of nutrition in absolute rather than relative terms.

In maintaining the metastable equilibrium known as life, it is necessary for us to draw upon countless sources in order to perpetuate this peculiar disequilibrium constituting living matter. Any constant factor, any single food, however valuable under certain conditions, will, over a prolonged period of uninterrupted use, eventuate only in the attainment of equilibrium by living cells, and such attainment is the physiological term for cellular death. Life is a continuing resistance against the thermodynamic equilibrium known as death. The antithesis comprising this phenomenon is itself a physical contradiction. Let us not be hesitant, therefore, to draw upon the almost infinitely varying resources that today contribute to nutritional adequacy.

With all this said and the hour late, I find that time has not permitted our exploration of new and exciting areas of practical nutrition. There are, for example, vitamin B15 (pangamic acid) and the associated phenomenon of transmethylation upon which I have done considerable pioneering research. This is not to mention Oratrile and the general physiology of the betacyanogenetic glucuronosides, nor the connection of these with the problem of contrasenescence or youth extension. I should have liked also to mention the Contrasenescent Quotient and to have reviewed the exciting data on the contrasenescent effect of many of these new and wonderful modalities we now have available.

It has been a privilege to address a group in which we all share a common enthusiasm and devotion for the reality and promise of scientific nutrition — a reality and promise that already exceed the limitation of words if not of imagination.

NEW TECHNIQUES OF ATHLETIC TRAINING AND CONDITIONING

(Part 2)

Thomas Kirk Cureton, Ph.D.

Improving the Nutrition (And Eating Habits) of Athletes

The newer concept in nutrition of athletes is that food must not only be adequate in terms of carbohydrates, fats and proteins but it must also be catalyzed with vitamins (48,51), which act much like insulin and adrenalin, to speed up the burning of food, and to assist it to enter into the cells, where the biologic motor burns it up in the metabolic process now known as the Krebs cycle (52,53). The best catalyst is probably oxygen itself, and why very high cardiovascular condition and circulatory fitness should be sought.

Next, the glycogen reserves should always be adequate and swiftly available during strenuous athletic action (49,50). Many events take only a few minutes of violent muscular action. In this regard, the lenoleic acid of wheat germ oil converts to arachadonic acid and then the latter to glycogen. Dr. Connor Johnson, of the animal nutrition laboratory, of the University of Illinois, has shown that guinea pigs who have been fed wheat germ oil do form relatively more glycogen in the muscles, indicating the potential for a much more active metabolism. Dr. Benjamin Ershoff, of the University of Southern California, demonstrated that guinea pigs with weight tied to their legs, and who had taken wheat germ oil for several weeks of feeding, swam longer than those who had not taken the wheat germ oil.

The feeding of wheat germ oil to athletes, and also wheat germ, and vitamins has been common practice in the United States and Australia for over ten years (54,55,56,57,58). There are many testimonies to show that this has helped performance. The controlled experiments are few, but these trends of evidence favor its use for improving endurance performance, provided the feeding is for six weeks or more and no major detrimental influence intervenes (such as over-training or poor psychological state due to losses). The evidence as seen and known by the writer is quite impressive, and is enough to warrant its use, in spite of doubts to the contrary. Several experiments have been conducted on young men, older men and young boys. At least, there is a trend favoring more improvement, more physiological economy, or better all-out performance after wheat germ oil feeding (59,60,61). Even young boys improved their stamina after several weeks of feeding on wheat germ, wheat germ oil, and crystals of wheat germ oil, than did those who were in the same program as matched control groups. Consistency in a trend of advantage for wheat germ oil was demonstrated for four years in succession (62). Groups of young men in hard training at the Navy Underwater Swimmer's School, at Key West, Florida, and also at Little Creek, Virginia, did better in the "tough" program of endurance work if fed on WGO or Crystals of WGO for the entire time of the courses, compared to control groups.

The youth of America eat an over-abundance of fried animal fats (fried potatoes, chips, fried fish, hot dogs, pork sausage, gravies, hot breads, heated butter, and hidden greases in cakes, waffles, biscuits, pastries and ice cream). Too many engage in smoking, soft drinks, alcohol and rich food in general. There is considerable aversion to highly vitaminized foods like liver, spinach, collards, carrots, and all of the green, yellow and red vegetables. Several studies testify to the poor endurance level of American children (58).

The "steak before a contest" is now attacked by Guild (63), who recommends a simple carbohydrate meal, consisting of citrus fruit, tea, honey, canned fruit and dry toast. The last meal is probably best about three hours before racing. Great care should be taken to avoid over-eating.

It is our concept that the physical work of training may gradually exhaust certain critical nutritional ingredients, and "staleness" may result, along with symptoms of fatigue, lassitude, and indisposition to work hard. It is probably best to train eight weeks, then rest a week; then train eight weeks, and rest a week (48).

Two interesting examples will now be told from experience. An American swimmer, Gary Heinrich, became afflicted with severe pain in his right side following each time trial leading up to the 1959 Pan-American Games, in Chicago. In the preliminaries in the 1500 m. swim he was again attacked very severely. He had been working much harder than usual for several weeks. I was called in to interview the trainer about his condition. A

medical examination showed normal white corpuscular count. It was suggested that he not swim any more time trials, and that he rest more than usual, until his nutrition had a chance to catch up. He was also put on 5 mg. of vitamin B_1, 150 mg. of vitamin C, and 10 capsules of wheat germ oil (6 minims each). After three weeks he was again raced to the limit and made extraordinarily good time without any side pain.

Recent reports from Townsville, Australia, indicate that the training of the swimmers was controlled by the use of ECG, heartograph and hemoglobin tests. When these records were depleted, showing persistent fatigue, the competitors were given more rest.

The validity of dietary supplementation is strongly suggested by an experiment in which the Japanese made injections of vitamin B_1 before and after each race. Yamanaka responded to this with his very best times in the summer of 1959, when he defeated Al Sommers and George Breen of the American team who did not use any such injections.

Leading up to the 1956 Olympic Games in Australia two American men swimmers had used wheat germ oil regularly for several months before the races, namely, Bill Yorzyk and George Breen. Yorzyk won the gold medal in the butterfly and George Breen broke the world's record for the 1500 m. swim. Two of the American girls, Nancy Ramey and Shelley Mann, had also trained on wheat germ oil. They won second and first in the Butterfly-Dolphin race. Such boosting of the diet has been vigorously supported by Dr. Richard You, Olympic physician for the American team, and by Dr. Ernst Jokl and Norris Brookens, our medical collaborator in Urbana, Illinois.

Progressive Training and Avoidance of Staleness

The trend in all endurance sports is toward more extended use of "interval training." This term, appraised physiologically, means more and more work done aerobically (without oxygen deficit, or kept to a minimum). The severe fatigue and ultimate exhaustion effects are associated with prolonged oxygen deficiency. In "interval training" there may be momentary development of oxygen-debt but a rest interval permits recuperation before the next effort. The whole scheme is one of very gradual physiological adjustment by gradually advancing the intensity of the dosage of work. Such repetitious exposures to stress are met by definite physiological adjustment, so that more and more work can be done, and harder and harder intensities borne. The human system does not make the adjustments well if too much work is packed into too small a time. Competitors may be set back if too many time trials are held before the athlete is ready. The concept is that a sport which consists of three to four months of intensive competition should be gradually prepared for over seven to eight months (65). The work during the year progresses from 60% speed, to 70%, 80% and to 90%. The distances are gradually shortened, and the number of repetitions are increased. The scheme has led to much more total work being done and, to the surprise of many, the physiological adjustments have been better, resulting in improved records (21,22).

With such extended programs of endurance training it is now very important to give special attention to the avoidance of staleness. Simonsen and Keys (66) and Keys (67) have shown that lowered R and T waves of the ECG, along with prolongation of the P-QR interval, are associated with poor nutritional state of the heart muscle, and theoretically poorer performances. We have seen this to be true (30,43). This method has been followed by Cureton (44,45) (68) and subsequently by Carlisle (69) to check the condition of athletes. It has seemingly worked very well. The amplitude of the heartograph responds in a similar manner (23,72). The subjects in very best condition respond by relatively fast recuperation to normal after a very severe trial. Subjects in poorer condition may take as long as a week to recuperate from a strenuous time trial. The BCG may also be used (32).

Dr. W. Raab (29) of the University of Vermont calls attention to the lengthening of the P-QR interval (isometric phase) of the ECG in the face of long continued sympathetic stimulation associated with severe exercise, this acting adrenergically. So long as the vertical amplitude of the T-wave is great enough, or amplitude of the Brachial sphygogram, there is little danger; but when the amplitudes fall, there may be danger if they do not recuperate in a reasonable time. He also concludes that a strong vagal tone is protective because it acts to lengthen the P-QR interval and lengthen the actual contractile (isotonic) phase of the heart stroke. A heightened ST-segment along with a lengthened P-QR interval, indicates strong vagus tone, as does slow heart rate. A good sign of adequate function and nutritional state is the progressive increase of the amplitude of the Brachial pulse wave, and decrease of the ejection angle (71). A flattened T, or sphygmogram, along with a depressed ST-segment, and shortened P-QR segment within 0.15 secs. suggest

rest and nutritional boosting. These contrasts were demonstrated in a striking manner on a high hurdler named Wilbur Thompson (73). Carlisle has reported similar data on top swimmers of Australia.

Most coaches want to know the optimum type of interval training for each one of his subjects. We do not think that any absolute set rule can be set. Is is a matter of following each competitor to know this answer with any certainty. But Gershler's chart is now widely used (74). A 440-yard runner, for instance, begins eight months ahead of racing competition and adds 23 secs. to his best time as previously determined. He begins his interval training with this relatively slow pace. He then reduces the 440-laps about 2 secs. each month. The rest interval between quarters should permit 80 to 90% recuperation of the pulse rate. This usually works out to be 2-4 mins, for the 440; 4-6 mins, for the 660; 6-8 mins. for the mile, and 10-15 mins. for the 1½ mile. Among top track runners the total distance covered by milers, 2 milers, and by 5,000 and 10,000 meter runners, has certainly increased since this system began with Paavo Nurmi and Lauri Pihkala about 1923. The dosage approximates about 9 miles per day. This is broken down as follows:

1. Warm-up (if possible on the grass)—up to 3 miles, jogging. Then some stretching and deep breathing.
2. Interval Training—1 to 4 miles, according to event and state of training.
3. Taper Down—1 to 3 miles on grass.

To describe the terms which cover types of workouts, there are four terms in use: (a) Sprint (intervals ¼ to ½ distance); (b) Racing Rhythm (intervals ¼ to ½ distance at regular racing speed); (c) Run Whole Distance at 50%, 60%, 70%, 80%, and 90% speed; (d) Interval Training in Gradual Progression (usually by plan). My own terms are LOW GEAR (50 to 60% pace); MIDDLE GEAR (70 to 80% pace); and HIGH GEAR (90 to 100% pace). Workouts may begin at 1 hour, then gradually be increased to 2 and to 3 hours. The whole process is also known as the *long-slow-build-up.*

Very approximately, the scheme used in sports for building up fitness is characterized in three phases:

A. *Out Of Season Build-Up*
(steady, long but slow paced work)
1. Easy work and moderate work, alternated with rest intervals between, but keep moving 1 to 10 miles. Twice per week.
2. Rhythmical, continuous endurance exercises, 30 to 40 minutes, then jog 2 to 5 miles. Twice per week.
3. Prescribed resistance exercises, 1 hour, alternating muscle groups. Exercises specifically related to event. Twice per week. (Pulleys, Bar Bells, Treadmill, Rowing, Medicine Ball.)
4. Laboratory Tests (results to be used for individual guidance).
5. Outdoor Living. Camping, or Hard Physical Work (shoveling, digging, carrying stone, concrete, ice, farming, construction work).

B. *Pre-Season Conditioning for Event*
1. Prescribed form-exercises for each event (performed under supervision if possible repeated again and again).
2. Test Exercises, once per week (34). To relieve monotony: Obstacle course, Interval Training, Circuit Training, Steeplechase, Test Exercises.

C. *During Competitive Season*
1. Pacing race part-way, or Part-time Play of Whole Game or Event.
2. After a Rest, Repeat.
3. Speed Build-up to Full Speed: 50%, 60%, 70%, 80%, 90%, 100%.
4. Racing the Whole Distance All-out (or All-out in Test Exercises).
5. Repeat Trials in Event, i.e., Run Once, then Repeat.

Warm-Up and Protection of Athletes

Warm-up is usually helpful and generally "protective" for most athletes (75). The novice is apt to take too little warm-up, feeling that it is wasting energy. But the well-trained athlete does not fear warm-up and knows that it protects him. At the Melbourne Olympiad Bob Richards missed his first try with the bar set in the pole vault at 13'-0". It was a cold and windy day. He missed his second try; but then and there he took time for adequate warm-up by jogging and balk-vaulting, working away from the runway for a good 20 minutes. Then he went over the bar with a foot to spare. He went on to win his second Olympic title in the event at 14'-11¾".

Warm-up is usually different in different events. The javelin throwers and weight throwers usually warm-up with calisthenics and then perform "mock" throws, using half to three-quarters energy compared to all-out effort. The hurdlers and sprinters jog a bit, then do some stretching and grass calisthenics, then practice starts and short sprints. The middle distance runners do some calisthenics, then jog and walk, alternately, for about as far as their race or even more. Then they practice a few "paced" runs. No two events are exactly alike but in none should the athlete start cold.

Throughout warm-up on cool days athletes will usually retain their sweat clothes. Some will prefer to warm-up briskly, then take a rub-down on the hard worked muscles, take a "stint" of honey, or breathe oxygen, then go in for the real work.

From experimental work it seems to take about 20-minutes to get the blood into good circulation with a gradual warm-up. Such warm-up also prepares the mind of the athlete for supreme effort and full

belief in himself. Various schemes are used, such as: (a) Preliminary calisthenics, (b) A walk-Jog-Run Build-up, and continued with "pick-up" sprints. Some believe in vigorous deep muscle massage, preliminary oxygen breathing, a cold pack on the abdomen, to get stimulated for best effort.

Karpovich and Hale (76) reported warm-up to be of little value but most investigators do not agree with them, except those who have used the same inadequate warm-up procedures. Several facts should be considered: (a) the body temperature will steadily rise for 20-mins. or more in a gradual progressive warm-up, and performance has been shown to be better with better internal body heat; (b) Warm-up takes more time for older subjects; (c) some relatively poorly trained novices can be fatigued by warm-up and the experienced, well-trained not fatigued by even more warm-up; (d) several minutes are needed to mobilize the blood sugar and adrenalin, and to open up the capillaries in the muscles.

Usually, preliminary calisthenics should be begun about 45 minutes before an event; then some "mock" practice; then massage and possibly oxygen breathing, keeping warm right up to the time of the event. All experienced trainers believe that inadequate warm-up is the main cause of sudden strains. Danielson, of Norway, was observed in the Melbourne Games to begin with easy "mock" throws of about half-distance for about 30 minutes; then took his first two throws, and then let go "All-Out" and made a new world's record with the javelin.

The best way to protect the athlete is to have him gradually and fully prepared for the event; to have him properly taped where injuries may occur. It now seems significant that Roger Bannister refused a place on the 1948 British Olympic Team because he was in the middle of a long range development program, and he would not be prodded into running "all-out" before he was ready. Max Truex, of the U.S.A. also refused to run in several invitation races in the middle of his developmental period. But a few weeks before the 1956 Olympic Games John Landy ran two "all-out" mile races in the U.S.A. before he was fully trained, and this might have cost him the 1500 m. Olympic title. His legs were sore for weeks afterward.

There is also a system called "Hard Work Day", then "Easy Work Day", in alternation, which usually allows ample time for recovery if the work is graduated in steady progression toward "All-Out". Even after full training, it is doubtful if real "All-Out" should be attempted more than once each week in any sport.

In our opinion, the blood pH test, determined on a careful time schedule with the blood taken 2-3 minutes after the all-out exertion, and tested immediately, is a good way to check a supposed "all-out" performance. If the venous blood is reduced to 7.24 from 7.38, for instance, the effort is not all-out. It must be lowered to 7.0 or even lower to be really "all-out".

References

1. Cureton, T. K., Jr., Cinematography as a Method of Research in Athletics and Physical Performance, *The Research Quarterly*, 10:2:3-24, Dec., 1939.
2. Cureton, T. K., Jr., Mechanics of the Track Start, *Scholastic Coach*, 4:14-15, Jan., 1935.
3. Cureton, T. K., Jr., Mechanics of the High Jump, *Scholastic Coach*, 4:9-12, April, 1935.
4. Cureton, T. K., Jr., Mechanics of the Broad Jump, *Scholastic Coach*, 4:8-9, May, 1935.
5. Cureton, T. K., Jr., Mechanics of the Shot Put, *Scholastic Coach*, 4:7-9, April, 1935.
6. Cureton, T. K., Jr., Mechanics of Track Running, *Scholastic Coach*, 4:7-10, Feb., 1935.
7. Ganslen, R. V., Mechanics of the Pole Vault, Springfield, Mass.: (M.P.E. thesis), Springfield College, 1938; privately published later in a booklet, *Mechanics of the Pole Vault*, Fayetteville, Arkansas; revised, 3rd Ed. 1957. Pp. 93.
8. Gansen, R. V., Mechanics of the Javelin Throw, *Scholastic Coach*, 19:6:8+, Feb., 1950.
9. Ganslen, R. V., Mechanics of High Hurdling, *Scholastic Coach*, 18:6:11+, Feb., 1949.
10. Ganslen, R. V., The Hop-Step and Jump, (privately mimeographed), Fayetteville, Arkansas.
11. Webster, F. A., *The Science of Athletics*, London: Nicholas Kaye, 1848. Pp. 333.
12. Bunn, John W., *The Science of Coaching*, New York: Prentice Hall, 1955. Pp. 306.
13. Cureton, T. K., Jr., Mechanics and Kinesiology of the Crawl Flutter Kick, *The Research Quarterly*, 1:87-121, Dec., 1930.
14. Cureton, T. K., Jr., The Stop Watch Method, *Beach and Pool*, 4:15-19, Feb., 1930.
15. Cureton, T. K., Jr., Mechanics of Swimming—The Crawl Arm Stroke, *Beach and Pool*, 4:57-62, May, 1930.
16. Cureton, T. K., Jr., Coordination Tests in Swimming, *Beach and Pool*, 7:178, June, 1933; also, C .T. Wilson, *The Research Quarterly*, 5:4, Dec., 1934.
17. Lanoue, Fred, Analysis of the Basic Factors Involved in Fancy Diving, *The Research Quarterly*, 11:102-109, Mar., 1940.
18. Counsilman, James, Cinematographical Analysis of the Butterfly Breaststroke, Urbana: (M.S. thesis, University of Illinois), 1948. Pp. 119.
19. Silvia, Charles, Mechanics and Kinesiology of the Butterfly (Dolphin) Breast Stroke, Springfield, Mass., (privately mimeographed), 1955.
20. Cureton, T. K., Jr., W. J. Huffman, Lyle Welser, R. W. Kireilis and D. E. Lathum, *Endurance of Young Men*, Washington, D.C., National Society for Research in Child Development, National Research Council, 1945. Pp. 284.
21. Cureton, T. K., Jr., The Effect of Longitudinal Physical Training on the Amplitude of the Highest Precordial T-Wave of the ECG, *Medicina Sportiva*, 12:259-281, July, 1958.
22. Cureton, T. K., Jr., Review of Research to Determine Cardiovascular Condition, 1941-50, Washington, D.C., *Proceedings of the American Association for Health, Physical Education and Recreation*, pp. 167-177, 56th Annual Convention, Detroit, Michigan, 1951.

23. Cureton, T. K., Jr., in The All-out Run on the Treadmill and Oxygen Intake Test, *Physical Fitness of Champion Athletes.* Urbana: University of Illinois Press, 1951. Pp. 585.
24. Cureton, T. K., Jr., et al, *Physical Fitness,* (Springfield College Research Monograph), Body Type Related to Athletic Performance and Physical Fitness, *Supplement to the Research Quarterly,* 12:2:398-493, May, 1941.
25. Cureton, T. K., Jr., The Post-Exercise Blood Pressures in Maximum Exertion Tests and Relationships to Performance Time, Oxygen Intake and Oxygen Debt and Peripheral Resistance, *The Journal-Lancet,* (Minneapolis), 27:81-82, March, 1957.
26. Cureton, T. K., Jr., *Op. cit.,* ref. No. 23.
27. Ibid., ref. No. 23: and also, The Hearts of Athletes, *Illinois Medical Journal,* 99:143+, 1951.
28. Astrand, P. O., Human Physical Fitness with Special Reference to Sex and Age, *Physiological Reviews,* 36:307-335, July, 1956.
29. Raab, W., Degenerative Heart Disease from Lack of Exercise, paper presented in the University of Illinois Exercise Colloquium (mimeographed), now in Press, Dec. 6, 7, 8, 1959. Part of Monograph, *Proceedings of the Colloquium on Exercise and Fitness,* Chicago: The Athletic Institute.
30. Cureton, T. K., Jr., Effects of Longitudinal Physical Training on the Amplitude of the Highest Precordial T-Wave of the ECG, *Medicina Sportiva,* 12:258-281, July, 1958.
31. Cureton, T. K., Jr., Effects of Physical Training and a Wheat Germ Oil Dietary Supplement upon the T-Wave of the ECG and the Bicycle Ergometer Endurance Test, *Medicina Sportiva,* 1310:490-505, Oct., 1959.
32. Arbeit, S. R., Ernst Jokl, and others, Ballistographic Changes During a 30-Day Physical Training Period, *American Heart Journal,* 54:536-560, Oct., 1957.
33. Jokl, Ernst, Ballistographic Studies on Athletes, *American Journal of Cardiology,* 4:105, 1959.
34. Cureton, T. K., Jr., The Value of Hard Endurance Exercises and Tests to Produce Changes in Weight, Fat, Metabolism and Cardiovascular Condition, pp. 162-171, Santa Monica: 61st Annual Proceedings of the College Physical Education Association, 1958.
35. Cureton, T. K., Jr., Tables of Stop Watch Buoyance, or Vertical Floating Capacity, in *Warfare Aquatics,* 1943; also, in Factors Governing Success in Competitive Swimming, *Intercollegiate Swimming Guide* (Spalding's), pp. 48-62, 1934.
36. Cureton, T. K. (editor), *Abstracts of Graduate Theses,* Urbana, Illinois: College of Physical Education (213 Huff Gymnasium): (1) 1924-53, (2) 1953, (3) 1954, (4) 1955-56, (5) 1957, (6) 1958, (7) 1959. Bound mimeographed copies.
37. Cureton, T. K., Jr., Physical Fitness Tests of Top Athletes, *The Amateur Athlete,* 20:21-22, July, 1949.
38. Cureton, T. K., Jr., *The Effect of Physical Education Upon College Men,* Urbana: (privately produced for the College Physical Education Assn., mimeographed and bound), 1955. Pp. 70.
39. Cureton, T. K., Jr., Physical Training Produces Important Changes, Psychological and Physiological, pp. 46-63, *Sport Medicine,* Helsinki: Finnish Association of Sport Medicine, 1953.
40. Cureton, T. K., Jr., Improvement in Cardiovascular Condition Associated with Physical Training, Persistently Performed Sports and Exercises, *Proceedings of the College Physical Education Association,* 60:82-104, (Columbus, Ohio), 1957.
41. *Op. Cit.* Ref. No. 36.
42. Doctoral Abstracts in *Dissertation Abstracts,* Ann Arbor, Michigan.
43. Carlile, Forbes, T-Wave Changes in the ECG Associated with Prolonged Periods of Strenuous Exercise in Sportsmen with Special Reference to Training Swimmers, *Physical Education Journal,* Melbourne, Australia: No. 17, 10-20, Nov.-Dec., 1959.
44. Cureton, T. K., Jr., *Op. Cit.,* ref. No. 31.
45. *Ibid.,* ref. No. 31.
46 Beckner, G. L. and Travis Winsor, Cardiovascular Adaptations to Prolonged Physical Effort, *Circulation,* 9:835-846, June, 1954.
47. Winsor, Travis and George Beckner, Hypertrophy of the Heart, ECG Distinction Between Physiologic and Pathologic Enlargement, *California Medicine,* 82:151-158, Mar., 1955.
48. Bourne, G. H., Vitamins and Muscular Exercise, *British Journal of Nutrition,* 2:261-263, 1948.
49. Upjohn, H. K., J. A. Shea, F. J. Stare and L. Little, Nutrition of Athletes, *Journal of the American Medical Assn.,* 151:818-819, 1953.
50. Van Italie, T. B., L. Sinisterra and F. J. Stare, Nutrition and Athletic Performance, *Journal of the American* Medical Assn., 162:1120-1136, 1956.
51. Yakolev, N. N. ,O. potrebnost; v vitaminah B, C pri zaniatiiah Sportom, *Vop. Pit.,* 17:3-9, 1958.
52. Namyslowski, H. and B. Desperak-Secumska, Stan wysycenia vitaminia C wybrany grupy mtodzcisy akademickiej w latach, 1952-53.
53. Grafe, G. K., Optimal nye normy pitaniiadiia rekordsmeno-gymnastov, *Vop. Pit.,* 16:18-28, 1957.
54. Cureton, T. K., Jr. and R. H. Pohndorf, The Influence of Wheat Germ Oil as a Dietary Supplement in a Program of Conditioning Exercises with Middle-Aged Men, *The Reasearch Quarterly,* 26:391-407, Dec., 1955.
55. Cureton, T. K., Jr., Wheat Germ Oil, the 'Wonder' Fuel, *Scholastic Coach,* 24:34-37+, March, 1955.
56. Cureton, T. K., Jr., Diet Related to Athletics and Physical Fitness, (Part IV—Wheat Germ Derivatives) *Journal of Physical Education,* (Y.M.C.A., Akron, Ohio, editor Louis Cox), (in press).
57. Cureton, T. K., Jr., The Effect of Wheat Germ Oil and Vitamin E on Normal Human Subjects in Physical Training Programs, *American Journal of Physiology,* 179:628, Dec., 1954.
58. Cureton, T. K., Jr., Physical Fitness, How to Earn It and Keep It, (with some relationships to nutrition), *Journal of Physical Education,* 54:3-14, Sept.-Oct. 1956.
59. Ershoff, B. H. and Ezra Levin, Beneficial Effect of an Unidentified Factor in Wheat Germ Oil on the Swimming Performance of Guinea Pigs, *Fed. Proc.* (Am. Institute of Nutrition), 14:431-32, Mar., 1955.
60. Cureton, T. K., Jr., R. V. Ganslen, W. A. Smiley, S. Susic and C. White, Effects of Physical Training and a Wheat Germ Oil Dietary Supplement upon the T-Wave of the ECG and the Bicycle Ergometer Endurance Test, *Medicina Sportiva,* (Rome), 13:490-505, Oct., 1959.
61. Cureton, T. K., Jr., Effects of Longitudinal Physical Training on the Amplitude of the Highest Precordial T-Wave of the ECG, *Medicina Sportiva,* 12:259-281, July 1958.
62. Cureton, T. K., Jr., What About Wheat Germ? (Four Years of Experimentation Show Value of Wheat Germ (Kretschmer) and Derivatives of Wheat Germ (VioBin) and Synthetic Crystals (VioBin) to Help Physical Fitness, Urbana: *Scholastic Coach,* 29:24-26+, Nov., 1959.
63. Guild, Warren, The Pre-Contest Meal, *Proceedings of the Colloquium on Exercise and Fitness,* Chicago: (in press) The Athletic Institute, 1960.
64. Cureton, T. K., Jr., Unfitness of Young Men in Motor Fitness, *Journal of the American Medical Association,* 123:69-74, Sept., 11, 1943.
65. Rajki, Bela, *Competitive Swimming,* Budapest: Hungarian Swimming Assn., 1956.
66. Simonsen, E., A. Henschel and A. Keys, The ECG of Men in Semi-Starvation and Subsequent Rehabilitation, *American Heart Journal* 35:384-502, April, 1948.
67. Keys, A., Cardiovascular Effects of Undernutrition and Starvation, *Modern Concepts of Cardiovascular Disease,* 17:21-22, Sept., 1948.
68. Cureton, T. K., Jr., Scientific Control of Training (Fitness) and Staleness, *Physical Education Today,* (Manila), 7:7-9, Mar., 1960.

Cont'd on P. 116

DETERMINATION OF THE RESISTANCE LOAD FOR 1-RM AND 10-RM

Richard A. Berger, Ph.D.*

Weight training for the rehabilitation of muscular anomalies is common practice today. Although weight training was used before the time of Christ in athletic training, only since 1945 have resistance exercises been employed extensively for the muscularly handicapped. The impetus for the employment of weight training in physical rehabilitation was given by Thomas DeLorme (3), an orthopedic physician, who conducted experiments that showed satisfactory results from weight training in the restoration of strength and functional use of the exercised muscle.

The term weight training implies the progressive addition of resistance to a muscle as the muscle becomes stronger so that the load to be lifted is always maximum for a designated number of repetitions. DeLorme referred to this method of weight training as progressive resistance exercise (3).

DeLorme observed the training methods of weight trainers, who exhibited large muscle girth and great strength, and found that most of their exercises were performed for ten repetitions with maximum or near maximum loads for that number. He adopted ten repetitions as the number to employ in training and in his initial experiments showed that muscular strength and girth improved substantially with this number. DeLorme's method of training involved exercising with the maximum weight able to be raised for ten repetitions. This load was referred to as the ten repetition-maximum or 10-RM. The program of progressive resistance exercise advocated by DeLorme required the 1-RM (the maximum load a person could raise only once), to be determined once weekly. The 1-RM was the criterion used to measure strength improvement. The 10-RM was used in training for the other four days in the week.

A patient beginning a program of progressive resistance exercise would first be tested to determine 1-RM and then the 10-RM. The patient would exercise, the first four training days in a week, with one-half the 10-RM for ten repetitions, three-fourths the 10-RM for ten repetitions, and the 10-RM for the first, second, and third sets, respectively. Every fifth training day the 1-RM and 10-RM would be determined again and the next four training days the exercise loads would be based on the latest 10-RM value.

The 1-RM and 10-RM are determined by the method of trial and error. A load is raised once through a full range of motion and gradually increased until the 1-RM is attained. The same procedure is used to determine the 10-RM. The load is gradually increased until the 10-RM is reached. The 1-RM and 10-RM may not be exact because of the effects of fatigue resulting from this testing procedure which may reduce the ability of the muscles to contract.

Two experiments were conducted to determine the 10-RM more accurately and expediently. Klein and Johnson (4) tested six post menisectomy and quadriceps atrophy cases caused by athletic or traumatic injury. Once the 1-RM was determined by trial and error, five pounds were removed to arrive at the 10-RM. The loads lifted by the subjects were not given. It is obvious that the 10-RM determined by this method would be inaccurate in some cases since the subtraction of ten pounds from a 1-RM of 100 pounds results in a 10-RM that is 90 per cent of the 1-RM and a subtraction of ten pounds from a 1-RM of 30 pounds would result in an estimated 10-RM that is 66 per cent of the 1-RM.

Richards (5) tried to eleminate or keep at a minimum the effects of fatigue when testing for the 10-RM. He did this by determining the static strength of the quadriceps femoris muscle, by means of a cable-tensiometer, and relating this to a dynamic strength test. One-hundred and eighty-seven college students were tested to determine maximum static strength. The subjects were randomly assigned to one of four groups. Each group performed as many repetitions of knee extension as possible with a load equivalent to 30, 40, 50, or 60 per cent of their maximum static strength. The results showed that the 10-RM was between 30 and 40 per cent of the tensiometer strength. The 10-RM was interpolated to be 37 per cent of maximum static strength. When the 1-RM was determined for each subject and correlated with tensiometer strength the coefficient was .70. This coefficient indicates that in approximately half the cases the 10-RM could be predicted

*College of Physical Education, University of Illinois, Urbana.

accurately from the static strength test used in this study.

A later study was conducted by Clarke and Herman (1) that also employed the cable-tensiometer to measure the maximum static strength of the quadriceps muscles. A group of 30 subjects performed "all-out" repetitions with 30, 35, 40, 45 and 50 per cent of their maximum static strength using the knee extension exercise. Exercising with 50 per cent of static strength resulted in a number of repetitions closer to the 10-RM than the other per cents. The same kind of test was applied to the knee flexors and 55 per cent of maximum static strength was considered satisfactory for obtaining the 10-RM (2). The per cents of maximum static strength that best resulted in the 10-RM were found to be different in the studies by Richards (5) and Clarke and Herman (1). In the former study, 37 per cent was found to approximate the 10-RM but in the latter method 50 per cent was the approximation. However, in Richards' study the same individuals did not perform more than one set but were divided into one of four groups and performed all-out repetitions with either 30, 40, 50 or 60 per cent of their maximum static strength.

Purpose of the Study.

The methods to predict the 10-RM advocated by Klein and Johnson and Richards are more efficient and less fatiguing than simply employing trial and error procedures but still lack predictive validity. Reducing the 1-RM by ten pounds to arrive at the 10-RM still involves trial and error to determine the 1-RM. A coefficient of correlation of .70 between 1-RM and static strength indicates that predicting the 10-RM from a static strength test is deficient in accuracy.

The present study was undertaken to ascertain a more expedient and accurate method to determine the 1-RM and 10-RM and one that would minimize, at the same time, the effects of fatigue in these tests.

Procedure.

Ninety-four male subjects, enrolled in weight lifting courses at the University of Illinois, were tested to determine their 1-RM, 5-RM, and 10-RM on the bench press exercise. The testing was done after the subjects had engaged in a weight training program for 12 weeks. Since the subjects knew approximately their strength in the bench press lift, although the 1-RM, 5-RM, and 10-RM were determined by trial and error, they required fewer trials to arrive at the exact figures. The testing was carried out for three days with a rest day between. Only one test was given each test day. The bench press lift is performed with the subject in a supine position on a bench. A barbell is placed on the chest with the hands grasping the bar shoulder width apart, palms facing upward. The bar is raised vertically until the arms are fully extended. The lift was chosen because its execution could be easily standardized and does not require any particular skill to perform.

Treatment of the Data.

The 5-RM and 10-RM of each subject were converted into percentage scores based on the 1-RM. For example, a 1-RM of 100 pounds, 5-RM of 90 pounds, and 10-RM of 80 pounds would be converted into a percentage score of 90 for the 5-RM and 80 for the 10-RM. The percentage scores for the 5-RM and 10-RM were determined for each subject. The means and standard deviations of these percentage scores were determined for both the 5-RM and 10-RM. The percentage scores were interpolated for the 2-RM, 3-RM, 4-RM, 6-RM, 7-RM, 8-RM, and 9-RM.

Coefficients of correlation were determined between the 1-RM and 5-RM, 1-RM and 10-RM, and 5-RM and 10-RM.

Results.

The average percentage scores for the 5-RM and 10-RM of all subjects were 89.8 and 78.9, respectively. In other words, the average subject had a 5-RM that was 89.8 per cent and a 10-RM that was 78.9 per cent of his 1-RM. The mean percentages were interpolated for the 2-RM, 3-RM, 4-RM, 6-RM, 7-RM, 8-RM, and 9-RM and were 97.4, 94.9, 92.4, 87.6, 85.5, 83.3, and 81.1 per cent of the 1-RM.

The percentages for each RM are presented in Table I along with 1-RM values ranging from 20 to 200 pounds and corresponding percentages of these loads for the 2-RM, 3-RM, 4-RM, 5-RM, 6-RM, 7-RM, 8-RM, 9-RM, and 10-RM. For example, a person with a 6-RM of 70 pounds would have an approximate 1-RM of 80 pounds, a 2-RM of 77.9 pounds, a 3-RM of 75.9 pounds, a 4-RM of 73.9 pounds, a 5-RM of 71.8 pounds, a 7-RM of 68.4 pounds, an 8-RM of 66.6 pounds, a 9-RM of 64.9 pounds, and a 10-RM of 63.1 pounds. These figures can be located in Table I by first finding the 6-RM at the top and reading down until the closest number to 70 pounds is shown. The horizontal line containing the 6-RM of 70 pounds is then used to locate the approximate values for the other RM.

The standard deviations of the mean percentages were 3.36 for the 5-RM and 3.66 for the 10-RM. Once the true 1-RM is known the 10-RM should not

1-RM	2-RM	3-RM	4-RM	5-RM	6-RM	7-RM	8-RM	9-RM	10-RM
100.0%	97.4%	94.9%	92.4%	89.8%	87.6%	85.5%	83.3%	81.1%	78.9%
20.0	19.5	19.0	18.5	18.0	17.5	17.1	16.7	16.2	15.8
25.0	24.4	23.7	23.1	22.5	21.9	21.4	20.8	20.3	19.7
30.0	29.2	28.5	27.7	26.9	26.3	25.7	25.0	24.3	23.7
35.0	34.1	33.2	32.3	31.4	30.7	29.9	29.2	28.4	27.6
40.0	39.0	38.0	37.0	35.9	35.0	34.2	33.3	32.4	31.6
45.0	43.8	42.7	41.6	40.4	39.4	33.5	37.5	36.5	35.5
50.0	48.7	47.5	46.2	44.9	43.8	42.8	41.7	40.6	39.5
55.0	53.6	52.2	50.8	49.4	48.2	47.0	45.8	44.6	43.4
60.0	58.4	56.9	55.4	53.9	52.6	51.3	50.0	48.7	47.3
65.0	63.3	61.7	60.1	58.4	56.9	55.6	54.1	52.7	51.3
70.0	68.2	66.4	64.7	62.9	61.3	59.9	58.3	56.8	55.2
75.0	73.1	71.2	69.3	67.4	65.7	64.1	62.5	60.8	59.2
80.0	77.9	75.9	73.9	71.8	70.1	68.4	66.6	64.9	63.1
85.0	82.8	80.7	78.5	76.3	74.5	72.7	70.8	68.9	67.1
90.0	87.7	85.4	83.2	80.8	78.8	77.0	75.0	73.0	71.0
95.0	92.5	90.2	87.8	85.3	83.2	81.2	79.1	77.0	75.0
100.0	97.4	94.9	92.4	89.8	87.6	85.5	83.3	81.1	78.9
105.0	102.3	99.6	97.0	94.3	92.0	89.8	87.5	85.2	82.8
110.0	107.1	104.4	101.6	98.8	96.4	94.1	91.6	89.2	86.8
115.0	112.0	109.1	106.3	103.3	100.7	98.3	95.8	93.3	90.7
120.0	116.9	113.9	110.9	107.8	105.1	102.6	100.0	97.3	94.7
125.0	121.8	118.6	115.5	112.3	109.5	106.9	104.1	101.4	98.6
130.0	126.6	123.4	120.1	116.7	113.9	111.2	108.3	105.4	102.6
135.0	131.5	128.1	124.7	121.2	118.3	115.4	112.5	109.5	106.5
140.0	136.4	132.9	129.4	125.7	122.6	119.7	116.6	113.5	110.5
145.0	141.2	137.6	134.0	130.2	127.0	124.0	120.8	117.6	114.4
150.0	146.1	142.4	138.6	134.7	131.4	128.3	125.0	121.7	118.4
155.0	151.0	147.1	143.2	139.2	135.8	132.5	129.1	125.7	122.3
160.0	155.8	151.8	147.8	143.7	140.2	136.8	133.3	129.8	126.2
165.0	160.7	156.6	152.5	148.2	144.5	141.1	137.4	133.8	130.2
170.0	165.6	161.3	157.1	152.7	148.9	145.4	141.6	137.9	134.1
175.0	170.5	166.1	161.7	157.2	153.3	149.6	145.8	141.9	138.1
180.0	175.3	170.8	166.3	161.6	157.7	153.9	149.9	146.0	142.0
185.0	180.2	175.6	170.9	166.1	162.1	158.2	154.1	150.0	146.0
190.0	185.1	180.3	175.6	170.6	166.4	162.5	153.3	154.1	149.9
195.0	189.9	185.1	180.2	175.1	170.8	166.7	162.4	158.1	153.9
200.0	194.8	189.8	184.8	179.6	175.2	171.0	166.6	162.2	157.8

(N = 94)

Table to Predict Various Repetitions Maximum From One Lifting Bout

TABLE I

of the 1-RM in 68 per cent of the cases. In terms vary less than 75.24 or more than 82.50 percentages of actual pounds, a 10-RM approximation of 110.5 pounds, based on a 1-RM of 140, would not vary less than 105.3 or more than 115.5 pounds in 68 per cent of new patients with the same 1-RM of 140 pounds.

The coefficients of correlation were .968 between the 1-RM and 5-RM; .953 between the 1-RM and 10-RM; and .973 between the 5-RM and 10-RM. These high coefficients show that when the 1-RM, 5-RM, or 10-RM is known the other RM can be predicted with high accuracy. This assumption is also made for predicting any of the other RM values, less than the 11-RM, from any given RM value less than the 11-RM.

Application.

Although the data were collected from only one weight training exercise involving primarily the pectoral, tricep, and anterior deltoid muscle groups, the same proportional results should be obtained with any other muscle group. The 5-RM and 10-RM for any muscle in the body should approximate 89.8 and 78.9 per cent, respectively, of the 1-RM.

A new patient just beginning progressive resistance exercise would first have to determine the strength of the afflicted muscle, the 1-RM, so that progress may be recorded every week by re-evaluating the 1-RM throughout the training period. Then the load with which the patient will train is determined; this is the 10-RM. After the patient has warmed-up, a load is applied to the body in such a manner as to require the injured muscle to contract in order to raise this load. If the patient performs any number of repetitions less than 11 with this load, assuming maximum volitional muscular contraction, the 1-RM and 10-RM can be approximated and slight adjustments made, if any, on following tests to ascertain the true 1-RM and 10-RM. For example, a patient raising 60 pounds for seven repetitions (7-RM) should be able to raise 70 pounds once (1-RM) and 55 pounds ten times (10-RM) (See Table 1). These figures are close approximations and

Cont'd on P. 117

SOCIAL MOTIVATION OF CATATONICS*

Geraldine L. Hoseason, M.S.**

In the resocialization of a regressed schizophrenic patient the main problem is to discover a stimulus that will motivate him to respond to his environment. Some techniques which have been used successfully for motivation include art, music, social, folk and creative dance, crafts, and motivation clinics. Although these techniques have proved of inestimable value in the rehabilitation process the author believed that they present the following limitations: (1) frequently the situation is complex; (2) the stimuli are many and varied; (3) responses solicited are multiple; (4) various degrees of skill are needed to effect a response and (5) feelings associated with past experience could block the response. Because of these limitations the author believed that a higher degree of motivation could be reached by providing a new type of situation rather than by altering a procedure in a given technique. The new type situation should contain a simply structured environment with limited yet dynamic energy-laden stimuli, which would effect the individual on a primitive level, be unrelated to past experience, and which required no skill. The use of drums, the most ancient and primitive of all instruments, could provide a simple environment and the drum rhythms present a dynamic stimulus that could affect the individual on a primitive emotional level. The Conga drum seemed most appropriate because it was large and resonant, easy to beat with the hands, required no skill, and probably was unrelated to the prior experience of the subjects. A Bongo drum could extend the stimulus by providing a more complete range of sound and rhythmic patterns.

Hypothesis

The hypothesis was that through the use of drums as a simple stimulus the regressed patients would respond to the sound; they would communicate or express themselves through beating the drum; they would move to the rhythmic sound and ultimately would relate better to others in the group, and that growth in response to others in the group would prepare the subjects to learn some social skills and to participate successfully in new social situations.

Situation

The drum therapy experiment was carried out at the Veterans Administration Center, Brentwood Hospital, Los Angeles, California with a group of ten male chronic catatonic patients selected by Dr. Phillip Bassett, ward psychiatrist, on the basis of their inability to communicate or participate in any activity. The experimental subjects were the most regressed of the catatonic patients of the ward, who had been in a hospital situation for periods varying from 8 to 23 years. Because of their degree of regression and the limited time of the experiment, the subjects were assigned to this therapy on a prescription basis.

The environment was simple and as void of external stimulae as possible. Sessions were held in a large recreation room on the second floor of the patient's ward. Comfortable chairs were placed in a semi-circle at one end of the room facing away from the windows, radio, and television set. Three straight chairs and two large Conga drums were placed facing the group. The therapist was assisted by a professional drummer aide and a ward aide who knew the subjects. The group met once a week for one hour over a period of fifteen months.

Procedure and Progression

During the first three weeks, and occasionally during the fifteen month period, a few minutes of the session was devoted to a simple explanation of the purpose of the activity. Informally the experimenter explained that drums, particularly the large native drums, had been used for centuries as a means of non-verbal communication to send messages, to express emotions, and to motivate people into action. The leader suggested that their experience of listening to the drums, beating out the rhythms and moving to the drumbeats might also help them to communicate.

In order that the subjects would not become conditioned to a set format there was no pre-structured plan. However, various motivation approaches were used within each session. Some of the techniques utilized in orienting the group to the experimental situation were:

1. The therapist started beating a simple accented rhythm on the Conga drum and as the drumming continued a suggestion was made to "clap your hands on the heavy or accented beat." This elicited a simple motor response that seemed to appeal to the subjects. On a signal, the drummer aide joined the activity with the Bongo drum which seemed to make the simple

*Presented at A.P.M.R. Clinical Session, Tri-Organizational Conference, June 15, 1960, Santa Monica, Calif.

**Director, Jerrie Hoseason Studio for Rhythmic and Therapeutic Activity, Westwood Village, Calif.

rhythm sound more complex. The patients were able to discern the accent and to clap their hands on the accent because the heavy beat was always accentuated by the large Conga drum. The length of time that the constant drumming continued depended on the reaction of the group. When all of the subjects were participating in the rhythm the leader left the drum and encouraged the subjects to take a more active part in creating the rhythm. In the beginning the subjects took turns beating the drum; later they volunteered. Drummers were changed after they gained some satisfaction and before they lost interest. Everyone participated in the drumming during each session. On occasion a subject would wander to the drum and start beating it before the session started. When this occurred the leader encouraged the individual and the recognition seemed to stimulate others to volunteer. Sometimes the session was started by volunteers.

2. As soon as rhythms were established the therapist told the subjects to stand and they were then encouraged to move in some way, such as, "see if you can move your legs", "your shoulders", or "your arms". Sometimes the leader asked for a volunteer to move his body to the drum rhythms; at times there was a progressive volunteering until the whole group was moving; other times the group imitated the movements of a patient leader or the therapist. The therapist led them in such movements as squatting, bouncing, lifting the legs or swinging the arms.

3. To help establish relationship between each other the patients would: (a) hold hands, forming a circle, and move to the center of the circle where they were encouraged to greet each other vocally by saying "hi"; (b) without holding hands two groups formed a straight line at each side of the semi-circle, one group moved toward the other and said "hello" then walked backwards to place, the other group followed the same procedure; (c) working in couples, without holding hands, they moved across and around each other on cue; and (d) many times a conga line was used to terminate the session; however, the foot patterns and rhythms were varied.

At the end of ten months a strong rapport had been established so that the following methods could be used to encourage more verbal communication:

1. During the last ten minutes of the session each subject was asked to come into the center of the circle, to face the other members of the group, and to say something he wanted to say. Responses included, "I like the drum group", "It's a fine day", or "I don't know what to say". When a previous statement was echoed the patient was asked if he wanted to say anything else, which he generally did.
2. While the group sat in the semicircle one subject went around the circle and called each person by name. If a name could not be recalled the person told the subject his name and the subject repeated it and went to the next person. At times this was done in form of an introduction.
3. The therapist made a point of conversing with each individual before, during, and after each session.. Responses were encouraged.
4. As the patients volunteered to participate, as they played the drum, moved, and particularly as they talked, the leader strongly encouraged them to extend their verbal responses.

Progress of the group at the end of a year indicated that they were ready for an experience in a reality situation involving relationships with others. The author chose to prepare the members for a social dance situation using the following progression:

1. A social dance movement (step, together, step, hold) was taught to the group using for accompaniment drum rhythms played by the patients and drummer aide.
2. The therapist danced with each patient in the social dance position. As social skills extended through the learning of dance patterns the patients seemed free to participate more fully in the rhythm accompaniment. Two of the patients who had progressed in their social relationships volunteered to take turns playing the piano, others volunteered to play the Conga drums, while the aide played the Bongos.
3. A need for knowledge of social etiquette developed because the women's ward had been invited to attend a social dance with the group members.
4. Through a question and answer approach the group learned such basic social graces as how to ask for a dance, what to say if a collision occurred while dancing, how to conduct a lady back to place and how to thank her for the dance. These skills were practiced with the instructor during the social dance practice sessions.

5. During a discussion of personal appearance all members of the group agreed upon the importance of neatness and cleanliness.
6. Every member participated in two social dance events which culminated the experiment.

Leader Participant Relationship

Of prime importance to the success of any therapy is leadership, but the personality of the leader is particularly important in working with catatonic patients who withdraw from social contacts and motor activities, who refuse to respond to any stimulus, and who are overwhelmed by failure. In such a situation the leader is faced with a challenge to lead these patients from their low levels of regression toward reality.

The author was particularly cognizant of the leader participant relationship and carefully carried out the following beliefs and procedures during all sessions:

1. Each individual was spoken to before the session although there was no pressure for his response.
2. Individuals were treated as normal individuals who could and would respond well.
3. The author believed it was easier to establish rapport which was conducive to the growth of the patient, and more satisfactory to the leader-patient relationship, if nothing was known of the history of the individual's illness.
4. Every patient experienced success in accomplishing something each day. Patient responses were noticed and encouraged by the leader and the group, which motivated patients to further accomplishment.
5. The therapist assumed a participating-leader role rather than an authority role which provided the patients with pleasurable experiences through an informal atmosphere.

Evaluation

In evaluating the rhythm-motor experience the author was concerned only with behaviour and attitude changes of the participants within the therapy situation. Some of the observable changes that took place, within the fifteen month period were:

1. Patients were in contact and were more responsive to the situation. They participated fully during the session. They were interested in the accomplishments of others as well as themselves. They had a greater attention span and were more physically and mentally alert.
2. Patients displayed emotional changes in facial expressions from severe or lack of expression to pleasant expressions. Attitudes changed from stupor to interest, and from resentment to friendly responses. The emotional changes in some instances carried over to allow patients to participate in the recreational dances.
3. Patients' interest within the therapy situation expanded to such activities as playing the piano and singing.
4. The patients' movements were more varied and motile; there was variety in body movement patterns, in drum rhythms and in dynamics. Their coordination improved so that some of the patients extended the social dance pattern into a form of "jitterbug."
5. Patients used verbal communication and volunteered to lead the group, which displayed their decided change in relating to others.
6. The subjects enjoyed participating in a social dance situation and they responded with social graces.
7. Progress of some of the individuals within the group seemed to indicate the effectiveness of the experiment. Two of the patients, one hospitalized for eight years and one for sixteen years, were discharged to family care. One patient, hospitalized for eighteen years, was ready for family care group therapy, and one patient, hospitalized for twenty-three years was considered for a family trial visit. Others in the group progressed to other therapies and interests.

STUDIES IONIZATION THERAPY OF DENTAL ENAMEL

Electric current from a small battery in the handle of toothbrushes may some day team with fluoride-containing toothpaste to prevent much tooth decay, if hopes raised by dental research are fulfilled. A Veterans Administration study indicates that if fluoride is as beneficial toward the elimination of tooth decay as researchers believe it may be, the current from a small flashlight battery might, in the not too distant future, be sufficient to improve dental health in a large segment of our population.

A study on the penetration of ions through the enamel of human teeth is reported by Drs. E. C. Stowell, Jr., and J. B. Taylor of the dental research laboratory of the Long Beach, Calif., VA hospital.

Experiments proved that when the interior of teeth were positively charged with a 1½-volt battery, negative iodide ions could be made to penetrate the enamel at a fast rate. Most of these experiments have been conducted with the iodide ion because of easy availability. However, the iodide ion is a chemical relative of fluoride, which, with a negative charge, is believed by these researchers to behave in the same manner as iodide.

Fluoride has been found to have a favorable effect on the resistance of teeth to decay and on the troublesome condition of excessive sensitivity of teeth at the gum line when the gums have receded. Unfortunately, little fluoride will enter the enamel when it is applied directly to the teeth. But a positive charge applied to the teeth could cause an attraction of oppositely charged fluoride ion, and thus overcome the apparent chemical barrier that prevents fluoride entry into the enamel.

NEW DIRECTIONS IN WEIGHT TRAINING AND ATHLETICS*

(Report of a Symposium)

William R. Pierson, Ph.D.,FACSM**

The Southwest area membership of the American College of Sports Medicine presented a second symposium on weight training at the annual convention of the Southwest District, AAHPER, in Albuquerque, New Mexico, on April 20th. It was held in conjunction with the Division of Men and Boy's Athletics. The panel moderator, Carl E. Klafs, of Long Beach State College, was introduced by the vice-president of the Division, Dr. Joseph Dickson. Dr. Klafs then presented the speakers: Philip J. Rasch, Ph.D., College of Osteopathic Physicians and Surgeons; Derek N. Nunney, Ed.D., University of California, Los Angeles; and Gene A. Logan, Ph.D., University of Southern California.

Off-Season Conditioning

Dr. Rasch spoke on the role of weight training in the off-season conditioning program as it relates to strength development. Basic to his discussion were the assumptions that strength is desirable in an athlete and that progressive resistance exercises represent the most efficient means of increasing strength. Strength increase, however, is only of five reasons for a conditioning program; the other being increases in endurance, agility and skill, speed, and flexibility. The points to be considered in deciding how much emphasis is to be placed on the strength aspect are as follows:

1. Training tends to be specific—training for strength alone has slight effect on speed or endurance.
2. A certain amount of strength is necessary for successful participation in any sport, but increased strength above this level does not appear to contribute to better performances in speed or endurance events. However, it must be mentioned that optimal strength requirements for specific athletic events are not known, and it is safe to assume that the average athlete could use more than he has.
3. Weight training exercises do not appear to improve circulatory-respiratory endurance. This is probably because the usual weight training methods overload the muscular but not the circulatory-respiratory system. This was one of the considerations which led to the introduction of circuit training.

Dr. Rasch stated that if the primary purpose of the conditioning program is strength development, then the program should be accomplished during the off-season, because of time and fatigue factors. There is little enough time during the regular season of most sports to teach the requisite skills, let alone the additional time needed for a conditioning program. Further, the energy expended by the athlete in developing his strength is that much less that he has left for developing his skill. There are disadvantages which may result from such a program:

1. Additional strength my not be desirable. The added strength may increase the tendency to muscle tears. Muscle cramping seems more prevalent among heavily-muscled individuals, and too much emphasis on strength may increase the incidence of fractures of the humerus while throwing.
2. Some restriction of motion may accompany weight training. Correcting the round shoulders of the basketball player or the boxer may interfere with his ability to shoot baskets or to punch.
3. There is a possible deleterious effect on the knees from the full squat. In addition to ligament stretching in the deep knee bend there is the possibility of the athlete losing his balance and falling forward. The remedy is to place the athlete in front of a low bench with his feet pointing straight ahead, and to permit him to go down only to the point where he contacts the bench. If the deep knee bends are used instead of the full squat, it might be well to place a board under the lifter's heels. Low back difficulties result from the use of very heavy weights in the squat more often than knee trouble. Back trouble can also result from the practice of the straight-legged dead lift, and it is wise to use a hopper during this exercise.
4. There is some evidence that the hamstrings play an important part in the stabilizing of the knee joint, but it is difficult to exercise these muscles without the use of apparatus too awkward for conditioning of large numbers of athletes.

The basic principles involved in any weight training program are: (a) the overload principle, (b) fatigue is normal and it is necessary that it be experienced, (c) the exercise must be progressive in nature, (d) with the possible exception of the knee joint, exercises should be made through the entire range of movement, (e) rest pauses should be taken

*Publication No. 4, Southwest Area Members, American College of Sports Medicine.

**College of Osteopathic Physicians and Surgeons, Los Angeles.

between exercises or sets of exercises, (f) workouts should be at regular intervals, and (g) the exercise should be as specific to the specialty of the athlete as possible.

Dr. Rasch concluded his remarks with some observations on current weight training programs in football, track and field, and basketball.

New Concepts in Weight Training

The topic of Dr. Nunney's presentation was "Newer Concepts in Weight Training," and it was accompanied by a considerable number of graphic aids. He prefaced his talk with the following remarks: (a) exercising with weights is only one phase of the conditioning program, (b) physical conditioning is specific between sports, (c) there is a specificity of certain muscles within the individual, (d) conditioning should be continuous throughout the season, and (e) the conditioning program must be based entirely on the individual and the requirements of the sport. Dr. Nunney then went on to discuss the training methods of weight lifters, the Delorme method, the Oxford technique, the MacQueen method, and circuit training. He cited Zinovieff's study which had indicated that strength will increase regardless of method. Circuit training, which appears similar to the Army obstacle course wherein pieces of equipment are added, was introduced in England by Morgan and Adamson. Dr. Nunney's thesis was written on this topic, and he discussed the results. These results demonstrated that increasing strength through circuit training did not significantly decrease swimming times. Through the use of graphs, he pointed out three aspects of conditioning: strength, flexibility, and endurance, and noted the aspect emphasized should depend on the needs of the individual within the requirements of the sport. Athletes should attempt to bring all aspects to the optimum. Dr. Nunney mentioned Siebert's principle that the essential element of strength development is that of work per unit of time. According to Dr. Nunney, the studies of Hettinger and Muller indicate that a single two-thirds maximal isometric contraction per week will maintain strength, and anything above one-third maximal per day will increase it.

Prevention and Rehabilitation

The final presentation was made by Dr. Logan on "Weight Training in the Prevention and Rehabilitation of Joint Injuries from Athletics." The importance of weight training in the prevention of injuries lies primarily in the improvement of strength, endurance, and flexibility, the major components of muscular fitness. Strength is necessary for the stability of joints, particularly of the extremities; muscular endurance delays the onset of fatigue, allowing better reaction time and decreasing the susceptibility to further injury; and maximum flexibility, in addition to strongly contracted muscles, provides greater protection against injury. The total program concerning sports injuries should involve the prevention, rehabilitation, and protection against recurrence of the injury. The most important consideration is that of injury prevention, and the development of stability, by weight training, must be a primary essential. The emphasis on progressive resistance exercises methods adapted for medical use in World War II led to the adoption of therapeutic exercise which maintained or brought about increases in strength. Weight training is extremely effective in returning weakened joints to their original stability. It must be noted that the term "weight training" as used by Dr. Logan includes the use of springs, rubber bands, pulleys, or any device which can be used to provide resistance.

During his discussion on the prevention of joint injuries, Dr. Logan made the following points:

1. The objective of weight training in the case of sprains and dislocations of the joints is to develop mucle strength as a form of substitution for the torn, elongated ligaments.
2. Most ankle injuries occur on the lateral side, therefore, a preventive program to strengthen lateral stabilizing muscles is extremely important.
3. The functional integrity of the knee is dependent upon muscle support, and weight training can produce greater strength in muscles than before the injury.
4. The development of shoulder area musculature is beneficial for the absorption of impact and for stabilization of the joint. Concerning the prevention of recurrence, he stated that over-development is beneficial.

Dr. Logan concluded by stating that the major purposes of weight training in the prevention of athletic injuries are the provision of maximum stability of joints, the development of muscular fitness to enable the athlete to react quickly in an accident situation, and hypertrophy of muscle to provide better absorption of impact.

Following the formal presentations, there was a period of discussion and exchange of opinions.

(Note: The presentations of Drs. Logan and Nunney contained material which will later appear in published form. They did not wish to have this material reported in the present paper; therefore, only the sense of what they reported has been included.)

NEW DIRECTIONS IN WEIGHT TRAINING AND ATHLETICS*

(Report of a Symposium)

William R. Pierson, Ph.D.,FACSM**

The Southwest area membership of the American College of Sports Medicine presented a second symposium on weight training at the annual convention of the Southwest District, AAHPER, in Albuquerque, New Mexico, on April 20th. It was held in conjunction with the Division of Men and Boy's Athletics. The panel moderator, Carl E. Klafs, of Long Beach State College, was introduced by the vice-president of the Division, Dr. Joseph Dickson. Dr. Klafs then presented the speakers: Philip J. Rasch, Ph.D., College of Osteopathic Physicians and Surgeons; Derek N. Nunney, Ed.D., University of California, Los Angeles; and Gene A. Logan, Ph.D., University of Southern California.

Off-Season Conditioning

Dr. Rasch spoke on the role of weight training in the off-season conditioning program as it relates to strength development. Basic to his discussion were the assumptions that strength is desirable in an athlete and that progressive resistance exercises represent the most efficient means of increasing strength. Strength increase, however, is only of five reasons for a conditioning program; the other being increases in endurance, agility and skill, speed, and flexibility. The points to be considered in deciding how much emphasis is to be placed on the strength aspect are as follows:

1. Training tends to be specific—training for strength alone has slight effect on speed or endurance.
2. A certain amount of strength is necessary for successful participation in any sport, but increased strength above this level does not appear to contribute to better performances in speed or endurance events. However, it must be mentioned that optimal strength requirements for specific athletic events are not known, and it is safe to assume that the average athlete could use more than he has.
3. Weight training exercises do not appear to improve circulatory-respiratory endurance. This is probably because the usual weight training methods overload the muscular but not the circulatory-respiratory system. This was one of the considerations which led to the introduction of circuit training.

Dr. Rasch stated that if the primary purpose of the conditioning program is strength development, then the program should be accomplished during the off-season, because of time and fatigue factors. There is little enough time during the regular season of most sports to teach the requisite skills, let alone the additional time needed for a conditioning program. Further, the energy expended by the athlete in developing his strength is that much less that he has left for developing his skill. There are disadvantages which may result from such a program:

1. Additional strength my not be desirable. The added strength may increase the tendency to muscle tears. Muscle cramping seems more prevalent among heavily-muscled individuals, and too much emphasis on strength may increase the incidence of fractures of the humerus while throwing.
2. Some restriction of motion may accompany weight training. Correcting the round shoulders of the basketball player or the boxer may interfere with his ability to shoot baskets or to punch.
3. There is a possible deleterious effect on the knees from the full squat. In addition to ligament stretching in the deep knee bend there is the possibility of the athlete losing his balance and falling forward. The remedy is to place the athlete in front of a low bench with his feet pointing straight ahead, and to permit him to go down only to the point where he contacts the bench. If the deep knee bends are used instead of the full squat, it might be well to place a board under the lifter's heels. Low back difficulties result from the use of very heavy weights in the squat more often than knee trouble. Back trouble can also result from the practice of the straight-legged dead lift, and it is wise to use a hopper during this exercise.
4. There is some evidence that the hamstrings play an important part in the stabilizing of the knee joint, but it is difficult to exercise these muscles without the use of apparatus too awkward for conditioning of large numbers of athletes.

The basic principles involved in any weight training program are: (a) the overload principle, (b) fatigue is normal and it is necessary that it be experienced, (c) the exercise must be progressive in nature, (d) with the possible exception of the knee joint, exercises should be made through the entire range of movement, (e) rest pauses should be taken

*Publication No. 4, Southwest Area Members, American College of Sports Medicine.

**College of Osteopathic Physicians and Surgeons, Los Angeles.

between exercises or sets of exercises, (f) workouts should be at regular intervals, and (g) the exercise should be as specific to the specialty of the athlete as possible.

Dr. Rasch concluded his remarks with some observations on current weight training programs in football, track and field, and basketball.

New Concepts in Weight Training

The topic of Dr. Nunney's presentation was "Newer Concepts in Weight Training," and it was accompanied by a considerable number of graphic aids. He prefaced his talk with the following remarks: (a) exercising with weights is only one phase of the conditioning program, (b) physical conditioning is specific between sports, (c) there is a specificity of certain muscles within the individual, (d) conditioning should be continuous throughout the season, and (e) the conditioning program must be based entirely on the individual and the requirements of the sport. Dr. Nunney then went on to discuss the training methods of weight lifters, the Delorme method, the Oxford technique, the MacQueen method, and circuit training. He cited Zinovieff's study which had indicated that strength will increase regardless of method. Circuit training, which appears similar to the Army obstacle course wherein pieces of equipment are added, was introduced in England by Morgan and Adamson. Dr. Nunney's thesis was written on this topic, and he discussed the results. These results demonstrated that increasing strength through circuit training did not significantly decrease swimming times. Through the use of graphs, he pointed out three aspects of conditioning: strength, flexibility, and endurance, and noted the aspect emphasized should depend on the needs of the individual within the requirements of the sport. Athletes should attempt to bring all aspects to the optimum. Dr. Nunney mentioned Siebert's principle that the essential element of strength development is that of work per unit of time. According to Dr. Nunney, the studies of Hettinger and Muller indicate that a single two-thirds maximal isometric contraction per week will maintain strength, and anything above one-third maximal per day will increase it.

Prevention and Rehabilitation

The final presentation was made by Dr. Logan on "Weight Training in the Prevention and Rehabilitation of Joint Injuries from Athletics." The importance of weight training in the prevention of injuries lies primarily in the improvement of strength, endurance, and flexibility, the major components of muscular fitness. Strength is necessary for the stability of joints, particularly of the extremities; muscular endurance delays the onset of fatigue, allowing better reaction time and decreasing the susceptibility to further injury; and maximum flexibility, in addition to strongly contracted muscles, provides greater protection against injury. The total program concerning sports injuries should involve the prevention, rehabilitation, and protection against recurrence of the injury. The most important consideration is that of injury prevention, and the development of stability, by weight training, must be a primary essential. The emphasis on progressive resistance exercises methods adapted for medical use in World War II led to the adoption of therapeutic exercise which maintained or brought about increases in strength. Weight training is extremely effective in returning weakened joints to their original stability. It must be noted that the term "weight training" as used by Dr. Logan includes the use of springs, rubber bands, pulleys, or any device which can be used to provide resistance.

During his discussion on the prevention of joint injuries, Dr. Logan made the following points:

1. The objective of weight training in the case of sprains and dislocations of the joints is to develop mucle strength as a form of substitution for the torn, elongated ligaments.
2. Most ankle injuries occur on the lateral side, therefore, a preventive program to strengthen lateral stabilizing muscles is extremely important.
3. The functional integrity of the knee is dependent upon muscle support, and weight training can produce greater strength in muscles than before the injury.
4. The development of shoulder area musculature is beneficial for the absorption of impact and for stabilization of the joint. Concerning the prevention of recurrence, he stated that over-development is beneficial.

Dr. Logan concluded by stating that the major purposes of weight training in the prevention of athletic injuries are the provision of maximum stability of joints, the development of muscular fitness to enable the athlete to react quickly in an accident situation, and hypertrophy of muscle to provide better absorption of impact.

Following the formal presentations, there was a period of discussion and exchange of opinions.

(Note: The presentations of Drs. Logan and Nunney contained material which will later appear in published form. They did not wish to have this material reported in the present paper; therefore, only the sense of what they reported has been included.)

ATHLETIC TRAINING — Cont'd from P. 107

69. Carlile, Forbes, T-Wave Changes in the ECG Associated with Prolonged Periods of Strenuous Exercise in Sportsmen with Special Reference to Training Swimmers, *Physical Education Journal*, Melbourne, Australia: No. 17, pp. 10-20, Nov.-Dec., 1959; and also, The Athlete and Adaptations to Stress, *Ibid.*, Dec. 1955 and Mar., 1956).

70. Raab, W., P. dePaula, E. Silva and V. K. Starcheska, Adrenergic and Cholinergic Influences on the Dynamic Cycle of the Normal Human Heart, *Cardiologia*, 33:350-364, 1958.

71. Cureton, T. K. Jr., What the Heartometer Measures that is of Special Interest and Importance to Physical Educators and Physical Fitness Directors, *Physical Education Today*, 7:10-15, March, 1960.

72. Cureton, T. K., Jr., *Op. Cit.* ref. No. 55.

73. Carlile, Forbes, *Op. Cit.*, ref. No. 69.

74. Cherry, John K., and W. W. Boehrn, Modern European Controlled Internal Method of Distance Running, *Scholastic Coach*, 26:20+, March, 1957.

75. Barry, Alan J., and T. K. Cureton, Jr., Warm-up Studies in Athletics, *Physical Education Today*, (Manila), 7:21-25, March 1960.

76. Karpovich, P. V., and Creighton J. Hale, Warm-up in Athletics, *Journal of the American Medical Association*, Nov. 17, 1956.

"From Other Journals"

Unless noted otherwise, all abstracts have been prepared by Philip J. Rasch, Ph.D.

H. G. Lloyd-Thomas, The Effect of Exercise on the Electrocardiogram in Healthy Subjects. *British Heart Journal*, XXIII:260-270, May, 1961.

The exercise test is to determine the adequacy of the blood supply to the myocadium at a time when the demand for such a supply is increased by exercise. Sixty-seven healthy subjects performed the Master two-step test until halted by dyspnoea or fatigue. The P waves after exercise showed some increase in amplitude, and, not infrequently, an increase in duration. The P-R interval or P-Q interval was unaltered or slightly shortened. No change was observed in the QRS interval. No J depression relative to the P-Q segment was observed. The S-T segment never showed a plane or sagging configuration. There were no inversions of the T wave. There were no inversions of the U wave, and its amplitude either showed no change or decreased. There was no depression of the T-U segment. In a few cases extra systoles occurred. Lead III is regarded as an unreliable lead in this test.

Ake Brodelius, Osteoarthritis of the Talar Joint in Footballers and Ballet Dancers. *Acta Orthopaedica Scandinavica*, XXX:309-314, 1961.

The feet of 34 football players and 16 ballet dancers (13 females, 3 males) and 195 controls (123 males, 72 females) were examined for osteoarthritis of the talar joints. In the controls the incidence varied steadily with age, from 3% in patients below 24 to 50% in those aged 45 or over. All the football players but one and all but two of the dancers showed osteoarthritis of the talar joint. Recognized injuries cannot be held responsible for these cases; the condition appears to be caused by increased use of the ankles, although trauma may be a contributing factor. Os trigonum was not significantly higher in the players than in the controls.

R. S. Garden, Tennis Elbow. *Journal of Bone and Joint Surgery*, 43-B:100-106, February, 1961.

The essential features of tennis elbow are (1) tenderness on pressure over the radio-humeral gap, and (2) acute discomfort during resisted extension of the wrist. In their absence a diagnosis of tennis elbow should not be made. A bewildering list of suggestions in regard to its causation and treatment have appeared. However, contraction of the extensor carpi radialis brevis is the factor which produces the pain. Splinting, physiotherapy, manipulation, and injections (hydrocortisone, prednisolone, oxygen, or air) have been used in treatment. When they fail, surgical intervention may be required. Many operations have been designed for this purpose and excellent results have been obtained, but they all attack the region of the elbow joint and such measures are not to be undertaken lightly. With this in mind, the effect of a subcutaneous Z-shaped tenotomy of the extensor carpi radialis brevis at the wrist was investigated. When the cut ends had separated, a cat gut suture was inserted to hold them loosely together. Analysis of the results suggested that no patient failed to benefit from the operation, and most obtained full and lasting relief. Residual complaints were minor, and there was no reduction in the strength of wrist extension or grip.

Cardiovascular Effects of Nicotine and Smoking, by Carl J. Wiggers and others. *Annals of the New York Academy of Sciences*, 90:1-344, Sept., 1960. N.P.)

This series of thirty-seven papers by sixty-nine authors resulted from a conference on the cardiovascular effects of nicotine and smoking held by the New York Academy of Sciences in March of 1960. The experimental papers are grouped under six headings: the absorption and fate of nicotine, pharmacological actions of nicotine and tobacco smoke, the influence of nicotine and smoking on the peripheral circulation, action of nicotine and smoking on coronary circulation, other aspects of the pharmacology of nicotine and smoking, and effects of nicotine and smoking in cardiovascular disorders. There are two panel discussions presented, one on the significance of electrocardiographic and ballistocardiographic changes induced by smoking and the other on the effects of smoking in diseases of the peripheral vascular system. The sense of the conference can be found in these statements by Blackburn, Brozek, Taylor, and Keys: "There is no convincing evidence that smoking is involved in the underlying pathogenesis of cardiovascular disease, atherosclerosis, thrombosis, or hypertension. We are left with the ancient impression that the acute pressor and other as yet unknown acute effects of smoking may aggravate extant heart disease or precipitate manifest disease in a latent disease state, and that in this way smoking may exert its principal effect on cardiovascular mortality rate."

The observations of Haag, Larson, and Wetherby that rats exposed to cigarette smoke 14 times daily for almost their entire life span did not produce lung tumors supports Passey's findings that a five year period of experimentation to induce lung tumors in rats by exposure to strong concentrations of cigarette smoke failed to do so.

In view of the essentially negative findings which have resulted from controlled experimentation and the lack of a sound hypothesis for the belief that smoking is a causative factor in various disease states, one wonders at the fervor of those opposing it.

WRP

A. M. Thomson, W. Z. Billewicz, and R. Passmore, The Relation Between Calorie Intake and Body-Weight in Man. *Lancet*, 7185:1027-1028, May 13, 1961.

Orthodox teaching is that a heavy man or woman needs more food than a light one. The results of nutrition surveys show no such finding. Actually increasing weight is not accompanied by much rise in food intake. It follows that heaviness is associated with diminished physical activity.

Editorial, Risks of Hyperventilation Before Swimming Under Water. *British Medical Journal*, 5239:1596, June 3, 1961.

Professional swimming coaches know that a sudden loss of consciousness is common while training for competitive swimming, in which it is standard practice to hyperventilate for a minute or two before diving, in order to increase performance. It is almost certain the mechanism is the performance of a Valsalva maneuver directly after hyperventilation. Hyperventilation, by lowering pCO_2, causes constriction of cerebral vessels and dilatation of muscle vessels. The Valsalva maneuver raises the intrathoracic pressure and traps the blood in the peripheral veins, causing cardiac filling pressure and stroke output to fall to low levels. Unfortunately, it is the young, highly fit individual whose circulation is most likely to respond in this way.

R. S. Person and K. Golubovich, Electromyographic Investigation of Fatigue in Man in the Presence of Artificial Ischaemia of the Active Muscle. *Sechenov Physiological Journal of the U.S.S.R.*, 46:1380-1387, 1960.

Some authors consider fatigue is related to phenomena occurring in the muscles; others attribute it to changes in the cerebral cortex. Investigations involving the obstruction of circulation during static work generally are interpreted as proof of the importance of peripheral metabolic processes in fatigue. In this study the EMG potentials of the biceps were recorded while the subjects held a weight until fatigued. In certain experiments ischaemia was produced by a cuff applied to the arm and inflated to 30-40 mm Hg above the subject's systolic pressure.

The EMG patterns showed the characteristics of fatigue with a constant load, i.e. increased amplitude and reduced frequency. These changes were much more marked during ischaemia than without the cuff and appeared more quickly. Since such changes are produced by impulsations from the nerve centers, it was concluded that ischaemia in the muscles led to changes in the operating conditions of the motor nerve centers.It is difficult to say what receptors are involved, but the results remove one serious objection to the central theory of fatigue, as they demonstrate the importance of afferent influences, determined by changes in the active organ, on the central processes. (Translated by R. Crawford)

Editorial, Yoga and the Heart. *British Medical Journal*, 5234:1226, April 29, 1961.

Some yogi claim to be able to stop their heart beating at will. Recently B. K. Anand and G. S. Chhina found this was accomplished by essentially a Valsalva maneuver. By performing powerful forced expiration against a closed glottis for between 10 and 20 seconds, the yogi caused a disappearance of both pulse and heart sounds. Radiography and electrocardiography showed the heart continued to contract during this period. When normal respiration was resumed, the heart continued slower than normal for some time, while the blood pressure rose and the pulse pressure increased.

R. C. Swan, The Therapeutic Value of the Rocking Chair. *Lancet*, 7166:1441, December 31, 1960.

The great problem of old age is stasis. All situations which contribute to loss of activity are to be avoided. The dangers of bed rest are well known. A rocking chair enables a person to indulge in limited exercise, encourages venous return, promotes respiration, stimulates muscle tone and encourages supple joints, encourages sleep at night, and enables the individual to maintain integration within the family circle. The rocking chair is cheap, has no side-effects, is non-toxic, and requires no prescription.

Anthony Travill and John V. Basmajian, Electromyography of the Supinators of the Forearm. *Anatomical Record*, 139: 557-560, April, 1961.

There is no consistency in the descriptions of the actions of the supinators of the forearm given in the textbooks. EMG investigations show that slow unresisted supination, regardless of the position of the forearm, is brought about by the supinator. Fast unresisted movement with the elbow flexed or resisted movements require the cooperation of the biceps.

Thomas Kirk Cureton, Scientific Principles of Human Endurance. *Journal of Physical Education*, 58:81-86, March-April, 1961.

The following are among the scientific principles of endurance:

1. Endurance is more the result of training than of inheritance.
2. Adaptation to stress must be gradual.
3. Endurance is specific.
4. As endurance develops the body becomes able to tolerate more pain and higher levels of lactic acid. It becomes more efficient in at least three ways: (a) it becomes able to do the same work with less effort; (b) it develops greater relative oxygen intake and circulatory capacity; (c) there is biochemical improvement in the Krebs cycle.
5. Will power develops.
6. Overtraining may occur.
7. The pace of the work must be optimal.
8. Endurance work must be hard enough and long enough to increase capillarization and oxygen transport.
9. High energy phosphate (ATP) is depleted during exercise.
10. Vitamins are used up in hard work.

Strength-endurance differs from circulatory-respiratory endurance. Circulatory endurance differs from balance, flexibility, agility, strength, or power.

R. Passmore and R. E. Johnson, Some Metabolic Changes Following Prolonged Moderate Exercise. *Metabolism*, 9:452-455, May, 1960.

Current teaching is that the metabolic rate returns very quickly after exercise to the resting level, and that protein metabolism is unaffected by moderate exercise. These functions were measured in 10 men after they walked for 10 miles on a treadmill at 4 m.p.h. in the post-absorptive state. The mean oxygen consumption did not return to the pre-exercise level during the 3 to 8 hours of subsequent recovery. Urinary acidity, sodium, nitrogen, and osmotic excretions fell during the walk. In the recovery period sodium, nitrogen, and osmotic excretion rose significantly above the basal level; acidity and phosphorous did not. Potassium excretion did not change significantly.

RESISTANCE – Cont'd from P. 110

can be starting points to determine the exact 1-RM and 10-RM by trial and error.

REFERENCES

1. Clarke, David H. and E. L. Herman, Objective Determination of Resistance Load for Ten Repetitions Maximum for Quadriceps Development, Research Quarterly, 26:385-390, December, 1955.
2. Clarke, David H. and R. N. Irving, Objective Determination of Resistance Load for Ten Repetitions Maximum for Knee Flexion Exercise, Unpublished Paper, University of Oregon, Eugene, Oregon, 1958.
3. DeLorme, Thomas L., Progressive Resistance Exercise. New York: Appleton Century Crofts, Inc., 1950.
4. Klein, Karl K. and E. Johnson, Research: A Method of Determinnig the Maximum Load for Ten Repetitions in Progressive Resistance Exercise for Quadriceps Development, Journal of the Association for Physical and Mental Rehabilitation, 7:4, July-August, 1953.
5. Richards, Donald B., A Comparison of Cable Tensiometer Strength, 1-RM, and 10-RM Values Obtained in Knee Extension. East Lansing: Michigan State Universtiy, 1955. (Unpublished master's thesis.)

Please Patronize Our Advertisers

Students Corner

EDITOR'S NOTE—Students, particularly those majoring in Rehabilitation or Corrective Physical Education, are invited to contribute to this column.

Our contributor is Del Cox, Texas A & M, Clinical Trainee in Corrective Therapy, V.A.H., Houston, Texas

HYDROGYMNASTICS FOR THE DISABLED

The use of hydrogymnastics or water therapy in corrective therapy is one of the most practical and valuable treatment mediums that can be used today. The body or any specific part of it can execute movement which can not be accomplished in any other exercise media. Even some of the so called "immovable" individuals find a limited range of motion and movement in water.

The reduction of gravity pull allows the individual an increased range of joint motion, increasing the circulation and metabolism in the involved areas.

The use of water as a treatment is not new. Primitive races used water as an agent of healing and purification. Hippocrates used hydrotherapy with friction to treat muscle and joint disease. Galen prescribed baths for fever and gave water first place in treatment of disease. Homer referred in his writings to warm baths that were used for fatigue and injuries. During the Nineteenth Century water became increasingly popular as a medium in medicine. Today therapeutic use of water treatments and exercise in pools is increasing rapidly. Exercises performed in pools and tanks are used to help patients re-educate impaired muscles, correct or prevent deformities and restore muscle function.

The use of hydrogymnastics or water therapy in corrective therapy has several advantages. The bouyancy of water is a definite relief from confinement to bed, chair, or brace. Bouyancy of the water is also useful in assistive and resistive action, and it is helpful in handling the largest patients. The warmth of the water helps relax the patient and maintains good circulation and body tone. The effect of this type of therapy is invaluable to a patient's morale. In permitting him to move weak muscles more easily than on land and exercise non-affected muscle groups without strain, treatment encourages the patient toward greater effort and achievement. The patient can find that he can swim and perform in the water as well as any one else can; thus enabling him to enjoy a recreation activity that he once thought was lost to him forever.

Even boating is not lost to the patient once he finds that he can still swim. The water will build confidence in him, giving him a place where he has an equal or perhaps even a greater advantage over the normal person.

Although the specific values of swimming will be, in the final analysis, determined by the reaction and condition of each individual patient, it is possible to predict some of the more general values of swimming. These values are usually classified as either physiological or psychological. The physiological values are as follows:

1. *Develop or maintain organic strength* using the affected part to prevent further atrophy of the area.
2. *Increases movement within the joints.* The cushioning effect of the water minimizes the pressure within the joint, resulting in reduction of pain and a wider range of movement.
3. *Improves circulation.* Hydrogymnastics enables the patient to maintain proper balance, leaving the patient to obtain the maximum exercise for optimum results.
4. *Promotes deeper breathing.* The pressure of water causes deep breathing which strengthens the chest muscles and promotes low chest breathing, which is of value to circulation.
5. *Improves control of body movements.* The exactness of swimming strokes helps improve the coordination of the individual.
6. *Promotes better elimination.* The minimization of the force of gravity enables the patient to strengthen weakened abdominal muscles which helps to promote better elimination.

Some of the more obvious psychological values are:

1. *Results are apparent.* The ability to accomplish something that previously could not be done is an indication that progress is being made. This feeling of satisfaction of accomplishment might possibly result in an improved attitude toward his condition.
2. *Swimming skills and strokes present a challenge.* Aquatic programs planned specifically to meet the individual needs, will provide the patient an opportunity to project his thoughts beyond himself.
3. *Skills developed have a carry-over value.* Swimming skills once learned are not usually forgotten and should provide many hours of healthful, enjoyable recreation.
4. *Swimming is fun.* Hydrogymnastics provide an opportunity to satisfy one's desire to participate in a physical activity.
5. *Swimming offers an opportunity for success.* Through water therapy where the patient is less handicapped than anywhere else you may encourage him to attempt something new in another area of activity.
6. *Swimming offers opportunity to socialize.* Because swimming is fun and relaxes people both physically and mentally, social barriers that are ordinarily present on land are not apparent in the water.
7. *The handicapping condition is less apparent in the water.* The ability of the water to conceal an individual's handicap is of great value to the person who has not adjusted to his handicapped condition.

Cases selected for pool therapy are divided into at least three major groups: paralytics, amputees, and psychiatrics. The paralytics are further divided into flaccid and spastic according to the type of paralysis. For these, retraining is directed toward normal length of muscle, good posture, relaxation, coordination, and acquiring functional skills.

The amputees are further divided into the following sub-groups: Below-knee, above-knee and upper extremities. For these, water therapy is used for activities of daily living, balancing, coordination, and as a mild conditioning program.

The purpose of water therapy for the psychotic patient is to maintain muscle strength, a mild conditionary course, recreation, and as an outlet for frustration.

While using hydrogymnastics the therapists should take advantage of the following laws of physics (from Lowan and Roe):

1. A floating body displaces its own weight in water.
2. A body completely or partially immersed in water is lifted by a force equal to the weight of water displaced. (Force of water displaced pushes the body upward.)
3. Static pressure of water increases in direct proportion to its density and vertical depth. (Deeper you go, the greater the pressure.)
4. Viscosity is the internal resistance to movement of molecules of a fluid. (Straight edge of a rule passed through water is resisted, minimal-flat edge increases resistance.)
5. Pressure on the surface of a moving part is directly related to the velocity of motion. (True when viscosity is disregarded. Faster the object moves, the greater the resistance or pressure against it.)

When selecting a place for instruction, there are certain aspects that should be considered. The pool should have a wide, skid-proof deck that is close to the surface of the water. Ideally the water level should be 0-9 feet if diving is included. The next best is a sitting or crawling depth. Also a ramp going into the shallow end is recommended. About ½ to ⅔ of the pool should be below 5 feet in depth. The pitch should be around 1 foot for every 5 feet. The bottom of the pool should be skid-proof with recessed ladders leading out of the deep end. The temperature of the water should range between 82° and 85° degrees F., with the temperature of the air 5° to 10° degrees higher than the water. The pH count should be close to 7.6 and 0.7 to 1.0 p. p. m. of combined available chlorine.

The locker and shower rooms should be on street and pool level with aisles wide enough for wheelchairs. Benches should be fastened to the floor and lockers large enough to hold braces as well as clothing. Wooden stools, arm braces on walls, non-slip mats, and shower chairs on casters should be used when needed.

The area of your pool should be in accord with the maximum capacity expected at one time. There should be at least 18 square feet per person of pool area.

There should be a limited amount of equipment used in the pool itself. The equipment might include a resting platform for the amputees, perhaps a directional device for the blind, and guide lines on the pool floor to act as a guide for walking.

Also movable equipment to be used in leisure time activities should be provided. Equipment such as flotation devices, swim-fins, swim-mitts, swim-goggles, kickboards, face masks, and nose clips should be provided. Also equipment such as water balls, rubber boats, air mattresses, diving rings, and large inflated rubber or plastic animals may be used.

There are certain basic safety skills an individual should be able to do before any hydrogymnastics can be started. These are:

1. *Breath control.* This includes mouth-breathing, breath-holding, and rhythmic breathing.
2. *Prone float and recovery.* Assume a face-down floating position and return to his starting position.
3. *Back float and recovery.* Assume a face-up floating position and return to his starting position.
4. *Turning over.* Be able to turn from front to back and back to front.
5. *Changing direction.* Be able to change direction while swimming or floating.

A hydrogymnastic program should be divided into three parts: Exercises, swimming, and free time. Exercises should be prescribed according to the individual patient by the therapist or physician. Even the specific length of time for each exercise should be prescribed by a doctor or therapist.

Swimming has a medical use in the recovery of the individual. It should be utilized to exercise the same movements as the specific exercises did. A functional and kinesiology analysis of every stroke needed may be found in Laning. Swimming should be used as one of the carry-over ways of exercising the affected part after the patient has left the care of the therapist, as well as for recreational and enjoymental use.

The free time in the program should be utilized mainly for environmental reasons. The atmosphere of the swimming class should be one of peacefulness and calmness. Socialization takes place during this time. If the situation presents itself, even some races and team activities might be used at this time.

Some programs are set up on a 30 minute basis, but the overall length of each period should be determined according to the situation and individual. The number of sessions daily also depends on the individual and situation.

BIBLIOGRAPHY

1. American Red Cross, *Swimming and Diving*, Doubleday and Company, Inc. Garden City, New York, 1938.
2. American Red Cross, *Swimming for the Handicapped*, Midwestern Area, St. Louis, Missouri, 1955.
3. American Red Cross, *Swimming for the Handicapped; Instructors' Manual*, February, 1959.
4. Coulter, John S. and George M. Piersol, *Handbook of Physical Medicine and Rehabilitation*, Chapter 11,

"Hydrotherapy", Blakiston Company for American Medical Association, Philadelphia, 1950.
5. Laning, H. F., *Convalescent Swimming*, Chief, Corrective Phy. Rehab., Dallas, Texas, 1948.
6. Lehr, Eugene and Charles C. Johnson, Jr., *Water Quality of Swimming Places*, U.S. Department of Health, Education, and Welfare, August, 1954.
7. Lowman, Charles L., *Technic of Under-Water Gymnastics*, Los Angeles, 1957.
8. Lowman, Charles and Susan Roen, *Therapeutic Use of Pools and Tanks*, W. B. Saunders Co., Philadelphia, 1952.
9. Nelson, P. A. and D. J. Erickson, Possibilities of Hydrotherapy in a Psychiatric Hospital, *Arch. Phys. Med.*
10. Schram, Duare, and Bennett, Underwater Resistance Exercises, *Archives Phy. Med.*, April, 1951
11. *Swimming Pools*, U.S. Department of Health, Education, and Welfare, 1959.

Chapter Activities

California-Nevada Chapter

The spring meeting was held on May 19 and May 20 at California State Polytechnic College, San Luis Obispo. Richard Anderson, Director of Adapted Physical Education at the college, acted as host and speakers included Richard G. Fowler on "The Status of Medical Recognition for Corrective Therapy"; Terry Behan on "Accomplishments and Problems Associated with Expanding Corrective Therapy Programs in the Bay Area"; Dr. Carrie Chapman on "Geriatric Amputee Rehabilitation"; and Harvey E. Williams, Ph.D. on "Current Research Trends and Problems — Their Relationship to Corrective Therapy."

Newly elected officers of the chapter are: President, Evelyn Loewendahl, Ph.D., Los Angeles; Vice Presidents, Miles McAfee, Berkeley and Cliff Loose, Santa Monica; Secretary, Stuart Robinson, West Los Angeles, and Treasurer, Herbert Daykin, Lawndale.

Book Reviews

Aids to Physiology, by E. T. Waters. (London: Bailliere, Tindall and Cox, 1961. 282 pp. n. p.)

Aids to Physiology appears to be the British equivalent of Main and Richardson's *Physiology*. Like it, citations and bibliographic entries are eliminated in the interests of brevity, although an index is provided. It consists of fourteen chapters, most of which are concerned with a single system of the body and are designed to be read in an hour or so. Each chapter endeavors to set forth the basic background and some of the "highlights" of its subject. The book is not planned to replace the standard texts; rather it is assumed that it will be read prior to going to class, so that the student will have had an introduction to the subject to be presented, or before examinations and at other times when a quick refresher is needed.

The physical dimensions of the text are small; a page measures about 4 x 6¼". While this may be convenient for slipping into a coat pocket, this reviewer found it so uncomfortable to hold as to seriously interfere with his willingness to make use of it. The material contained is generally not extensive enough for use by corrective therapists; for instance, the section on the electrocardiogram refers only to Leads I, II, and III, and gives no hint that the latter is considered unreliable in exercise tests. However, individuals enrolled in elementary human physiology courses or seeking a quick reference on some half-remembered point might find it of help.

PJR

Health Principles and Practice, 3rd edition, by C. L. Anderson and C. V. Langton. (St. Louis: C. V. Mosby Co., 1961, 430 pp. $5.75.)

This is a text which the authors state "incorporates those new health developments deemed significant to college students in their quest for a more effective and more enjoyable living." It is difficult to see how this can be accomplished with the reference material they cite. The 274-item bibliography refers almost exclusively to secondary sources and the pace of recent research in human biology makes such material obsolescent by the time it is published in the first textbook. An additional complication is the fact that the secondary sources selected are not always the most appropriate. For example, in the chapter on Exercise, Fatigue, and Rest, there is no reference to Licht's *Therapeutic Exercise*, Floyd and Welford's *Symposium on Fatigue*, or Bartley and Chute's *Fatigue and Impairment in Man*.

The authors have divided the material into two parts: Personal Health Promotion and Mental, Emotional, and Social Health. While the term "mental and emotional health" has the authority of tradition and custom, this reviewer has often wondered what distinguishes between "mental" and "emotional." Could it be the locus—mental health being associated with the cerebrum and emotional health with some other segment of the anatomy? Other than the title of Part Two, the Anderson and Langton text makes no mention of emotional health, so the answer needs be found elsewhere.

The authors have appended an excellent and quite comprehensive list of films and film sources for each of their twelve chapters.

WRP

The Book of Strength, by William Lindsay Gresham. (New York: John Day Company, 1961. 192 pp. $3.50.)

This book is written to interest the adolescent in body building, and has something of a missionary flavor: "We inhabit a body which has been given us by the Creator on a lifetime loan. It is our duty to keep it in good condition, to appreciate it and improve it." Getting strong and looking strong are described as "worthy ambitions."

Klein will no doubt turn pale at the recommendation that the trainee use leaping squats. (The author seems to use the terms "deep knee bends" and "squats" indiscriminately, without realizing that they are two different things.) Some of the advice seems better designed to turn out self-centered "mirror athletes" than to develop useful muscles. The strong emphasis on the use of protein is without scientific justification.

The program and exercises recommended are based on Calvert's double progressive system. Chapters are devoted to the use of dumbbells, advice to girls, answers to common objections to weight training, and suggestions for reducing weight. At the end of the book are several pages of stick figures illustrating various exercises. An index is included.

For the audience for whom it is designed, the text should prove satisfactory.

PJR

References on Motor Learning and Motor Performance, compiled by Elwood Craig Davis and Aileene Lockhart. (Washington, D.C.: A.A.H.P.E.R., 1960. 64 pp. Paper. $1.50.)

This pamphlet is No. 4 in the A.A.H.P.E.R.'s Fitness Series. It contains over 1400 items on research in motor learning and motor performance listed alphabetically by author. These comprise mainly titles of original research completed by 1957. It is interesting to note how few items are credited to *Perceptual and Motor Skills*, a journal which one might think would be preeminent in this area. One curiosity is that "A Reply to Mr. Lynch," by W. N. Kellogg is cited, but there appears to be no mention of Lynch's paper. The interpretation of the extent of the fields of motor learning and motor performance has been quite broad. The amount of work that has gone into the compilation must have been enormous. The bibliography should be of use to anyone working in any part of this field.

PJR

Treatment and Prevention of Athletic Injuries, by Joseph P. Dolan. Second Edition. (Danville, Illinois: Interstate Printers & Publishers, Inc., 1961. 472 pp. $5.50.)

A reviewer of the first edition of this text suggested that it needed a careful revision for a second edition (this *Journal*, November-December, 1955). Unfortunately, this recommendation appears to have gone unheeded. The system of citations is still markedly unsatisfactory. No bibliography is included. Much of the material appears to have been taken from other sources without credit—the picture on p. 174, for example, certainly owes its inspiration to the writings of Karl K. Klein, who is not mentioned in the book. A great deal of the contents—the Mayo Clinic diet, a baby's reflexes, the love life of the British Royal family, and the detailed discussion of epilepsy, for example—have no place in a work on athletic injuries. In some cases—as in Tennis Elbow—the presentation is totally inadequate. The definition of Tennis Leg as a tear of the plantaris muscle overlooks the fact that Arner and Lindholm have refuted this theory and shown that it is actually a rupture of the medial gastrocnemius belly. The inclusion of proprietary drug names is objectionable. The "shin" is defined (p. 112) as the shaft of the tibia and fibula. In medical terminology the shin is the anterior crest of the tibia. Neither definition allows of a "Kinesiology of the Shin," but that is precisely the heading which appears on p. 114. The author appears to be unaware of the 1955 revision of the *Nomina Anatomica* and employs anatomical nomenclature which is now obsolete. It would be possible to continue in this vein at length, but it is unnecessary to do so.

The recommendation that men warm up by doing bouncing full squats will certainly horrify most kinesiologists. Some of the statements made about weight training vs. weight lifting would be funny if it were not for the fact that they may mislead students. The book does contain some nuggets, but they are buried in the dross. The need for firm guidance from a competent editor is even more evident than it was in the first edition.

WRP

Orthopadische Krankengymnastic (Orthopedic Corrective Therapy) by Martha Scharll. (Stuttgart: Georg Thieme Verlag, 1961, 184 pp. $3.70.)

This second edition of a highly specialized textbook in orthopedic therapy consists of three parts. The first part is a dictionary of terms used in the field of orthopedic corrective therapy. All terms are clearly explained and are listed from "Abductions behinderung" which means restriction of abduction, to "Zwergwuchs" meaning several types of dwarfism. Whenever possible the Latin terms are included, permitting readers who are not too familiar with German to get a better understanding of the words and terms.

The second part deals with a selected group of orthopedic deformities and malfunctions. The etiology of such and their suggested treatment plans as well as the approach to correction are thoroughly discussed and described. The author pays particular attention to childhood deformities such as genu-valgum, genu-varum, scolioses of different origin, contractures, bad body postures, osteochondrosis and many more. Also the prevention of further development of such condition by exercises and activities are investigated and suggested.

The third part deals with exercises and applied activities as distinct treatment and prevention of the previously described orthopedic deformities and malfunctions. They are mainly individual exercises, but some group activities are suggested also. Most of the exercises are of the active type; however some passive exercises, especially in the beginning of the treatment phase are also suggested and described.

In addition to the precise and easily understood explanations, 96 illustrations help to give the reader an excellent insight into another specialized field of corrective therapy.

RK

Orthopaedia, by Nicolas Andry. (Facsimile reproduction. Philadelphia: J. B. Lippincott Co., 1961. Two volumes 310 pp. $10.00.)

At the time this reviewer wrote the historical section in *Kinesiology and Applied Anatomy*, he had not seen a copy of Andry's *Orthopaedia*, nor did he have any expectation of ever doing so. Happily, the Association of Bone and Joint Surgeons has now arranged with J. B. Lippincott Co. to publish a facsimile reproduction of the first English edition, originally produced in 1743. Andry proves to possess his full share of the bucolic charm of the 18th Century writers and the books can be opened almost at random and read for sheer pleasure.

> The ears (he says) are a great Ornament to the Head, when they are well fhaped, do not exceed a certain Size, are neatly placed, well bordered, and have all thofe little vermicular Turnings and Windings which compofe the external Parts of this Organ.
>
> What should be done to restore a missing eyebrow? Make a compofition of Oil of Honey, Oil of Wormwood, oil of bitter Almonds, and three drops of the Person's own Urine and rub the part with this Liquor several times a day for three Months or more.

Surely the saying "It is better to wear out than to rust out" originated in his defense of exercise:

> It is needlefs to object, that Exercife wears the Body; that is certainly true; but then you muft remember that the human Body is like Iron, which wears by being ufed; but if not ufed, is foon confumed with Ruft. In the fame manner you fee Men are worn by Exercife; but if they do not ufe Exercife, they fuffer more hurt from Reft and Indolence than if they did ufe it.

Andry coined the word orthopaedia to describe methods of preventing and correcting deformities of children, and worried over the effects of high heels (they should not be worn until the girl is five years old), reading, height of tables, construction of chairs, and numerous other matters which still concern us. In the Introduction Editor-in-Chief Anthony F. DePalma points out this work was the tiny seed from which has grown the impressive dimensions of modern orthopedic surgery. With equal justice he can be claimed as a direct ancestor of the corrective therapist or corrective physical education teacher. If the latter can afford but one classic in their professional libraries, this should be it.

PJR

Gehschule fuer Beinamputierte (Gait and walking school for leg amputees) by Herbert Kersten. (Stuttgart: Georg Thieme Verlag, 1961, 195 pp. $4.15)

This book is advertised as a text book for leg amputees, students and specialists in the field of orthopedics, makers of leg prostheses and for corrective therapists specialized in the re-training of any and all kinds of leg amputees. Mr. Kersten is a "Krankengymnast," the German counterpart of a corrective therapist in the States, and a "Gehschullehrer" which means a teacher in a school for walking and gait training. The author discusses in nine chapters of the book the re-training of leg amputees from simple exercises to prepare the stump for a prosthesis, to rather complex activities such as swimming, skiing and bicycling. The smallest details in the rehabilitation process are described. The basic physics involved in the rest position and movements are thoroughly explained and applied. Techniques and devices are suggested and discussed in a progressive lesson plan and appear to have excellent results with the trainees. The physiology and anatomy involved are mentioned and applied for a better understanding of the forces intricated in the walking and gait training courses.

The final chapter is written by Dr. Guenter Brumm, a physiatrist. He discusses the medical angle of the restoration, function and maintenance of the stump. He also touches on the psychological problems of the amputee and how to deal with them.

Many pictures, mainly photos, support the text. Likewise diagrams and drawings are utilized to bring the actualities of the many difficulties closer to the reader.

RK

Nutrition and Physical Fitness, Seventh Edition, by L. Jean Bogert. (Philadelphia: W. B. Saunders Company, 1960. 613 pp. $6.00.)

Nutrition and Physical Fitness is one of the finest examples of textbook writing that this reviewer has ever seen. It is clearly written, profusely illustrated, properly documented, supplied with questions and problems, adequately indexed, and well printed and bound. Specific points are substantiated by citations embodied in footnotes; general references not specifically cited in the text are grouped at the end of each chapter. The only readily apparent question is why the muscle model on p. 77 is shown as a coil spring when Huxley's electron microscope studies have convinced most physiologists that it is a mechanism composed of sliding filaments. The book is very definitely recommended to any teacher seeking a book for use in an academic course in elementary nutrition.

While the text may also be highly recommended to the non-academic reader, he may be apt to feel that the title promises more than the book delivers. There is, for example, no discussion of the use of protein supplements in heavy weight training; the presentation on vitamins does not refer to the dietary theories of the physiologists responsible for the training programs of the Soviet teams, the bibliography for the chapter on ascorbic acid does not include such names as Grafe, Namyslowski, or Yakovelev; the section on Diet for Special Conditions does not mention competitive athletes, no evaluation of Cureton's claims for the virtues of wheat germ oil or of Davis for "tiger milk" is offered; there is no consideration of the special problems of "making weight." The coach, trainer, or athlete, should be warned that the words "Physical Fitness" in the title should not lead him to expect that any particular attention is paid to the problems of training and conditioning men for the physical fitness required in championship level effort. They may, of course, be directed to Mayer and Bullen's Nutrition and Athletic Performance, *Physiological Reviews*, July, 1960, but it would be unfortunate if any purchaser of such a fine book should feel that he was misled by its title.

PJR

Lehrbuch der Krankengymnastic (Text book of Gymnastics for the Ill) by K. Lindemann, H. Teirich-Leube and W. Heipertz. (Stuttgart: Georg Thieme Verlag, 1961, 398 pp. $9.40)

This book is the second of four volumes designed as standard texts for students and practitioners of exercise, corrective, and physical therapies. (See this *Journal* September-October 1959). While the first volume contained human physiology, etiology of certain deseases, first aid human physiology, etiology of certain diseases, first aid and bandaging, history and fundamentals of corrective therapy, methods and techniques used in corrective therapy, pool therapy and massage, the second volume deals entirely with human anatomy. The subtitle of this second volume is "Anatomie desmenschlichen Koerpers," which means anatomy of the human body. It was especially prepared and organized by Drs. M. Kantner and W. Reinbach of Heidelberg.

The first section of the book, (by Reinbach) explains general anatomy of cells and tissues. The second section discusses special anatomy, which he divides into the anatomies of the passive organ of movements, the active organs of movements, the different systems such as the digestive and respiratory, the endocrine system and heart.

The second section, (by Kantner) explains nerves and vessels and their relationship to organs and systems explained in the first part of the book. The lymphatic vessels and circulatory system, and the brain as well as the spinal cord are discussed in details with particular reference to the rest of the human body. The text is clear and precise, and the authors believe that their book will be of help in the study of all the medical and paramedical arts and sciences. There are 203 illustrations some of them in color. The second volume appears just as promising as the first one and it raises great expectation for its successors.

RK

Adhesive Strapping Techniques, by Bill Dayton. (New Haven: Seamless Rubber Company, 1960. 47 pp. Paper. $1.00.)

The preface states that this booklet "has been prepared for the sole purpose of detailing the fundamentals of adhesive strappings as they are used in athletics." It is comparable with Glimstead's *Adhesive Plaster Bandaging in Athletics*, which was the standby of the trainer in the 1920s and 1930s. In the booklet most of the common adhesive strappings are shown in profuse illustrations and described in the accompanying text. In the majority of the cases the illustrations and explanations appear virtually identical with the material contained in Dayton's *Athletic Training and Conditioning*. A few of the better known strappings, such as the Drake ankle strapping and the Duke Simpson knee strapping, are conspicuous by their absence, but on the whole the novice trainer will find everything that he needs to tape the common injuries. The Seamless Rubber Company should be complimented on the tasteful way in which they have handled the advertising of their products. Such promotional material as the booklet contains is dignified and entirely acceptable to a professional audience.

PJR

Methods and Materials for Secondary School Physical Education, by Charles A. Bucher, Constance Koenig, and Milton Barnhard. (St. Louis: C. V. Mosby Co., 1961. 387 pp. $6.50.)

This is a text designed for present and prospective teachers of physical education. It is well organized and divided into seven sections: the student and the teacher, the setting, goals of physical education, health goals, program, physical fitness, interpreting the program, teaching techniques, grading and evaluation, and problems faced by the beginning teacher. The material is clearly written. However, a text is dependent upon more than the sum of its parts; it must have unity, and the illustrations of this text, rather than supplementing the written material, frequently detract from it. In appropriateness, they run the gamut from A to Z. For example; there are three similar photographs of hurdlers illustrating respectively: the aim of physical education, interscholastic athletics, and "What is the attitude of the community toward interscholastic sports?" There are seven photos of people sitting and apparently doing nothing. One photograph shows a high school football game and is captioned, "Parents are interested in the school's physical education program." There are no parents among the spectators, with the possible exception of the referee and a policeman.

With the exception of the numerous photographs, the text presents some worthwhile material for the beginning teacher and should be of considerable aid to him as a reference work.

WRP

Techniques for the Study of the Behavioral Effects of Drugs, by Peter B. Dews and others. (Annals of the New York Academy of Sciences, 65: 245-356, November, 1956, N.P.)

This series of eight papers by twelve authors resulted from a conference held by the sections of Biology and Psychology is May of 1956. The papers discuss the effects of drugs on the behavioral patterns of cats and on Type S conditioning in rats, the modification of performance in pigeons by drugs, drug-behavior interaction in rats, the effects of drugs on behavior characteristics of pigeons, the value of using a variety of measures in studying the effects of drugs on motivation of rats, and the technique for studying the effect of drugs on discrimination in the pigeon. The final paper in the series, "The Description and Analysis of Mood," utilized human subjects. The authors of this last have postulated four bipolar dimensions for the description of mood based on the assumption that mood as an intervening variable supplies information about the functioning characteristics of the organism. These dimensions are: level of activation, level of control, social orientation, and hedonic control.

WRP

PRESIDENT STRESSES PHYSICAL FITNESS AS ESSENTIAL TO NATIONAL VITALITY

In an unusual departure from usual practice, President Kennedy returned to the rostrum of the State Department Auditorium in Washington five minutes after his press conference of July 19 to deliver to newsmen a call for the nation's schools to begin a basic program of "physical development, exercise and achievement." The President stated that this program was essential for the physical vigor and energy of the nation. Speaking extemporaneously, the President delivered a talk which was filmed for distribution to schools and other interested groups.

The President's Statement

The text of Mr. Kennedy's statement on physical fitness follows:

The strength of our democracy and our country is really no greater in the final analysis than the well-being of our citizens. The vigor of our country, its physical vigor and energy, is going to be no more advanced, no more substantial than the vitality and will of our countrymen.

I think in recent years we have seen many evidences in the most advanced tests, comparative tests, that have been made that many of the boys and girls who live in other countries have moved ahead of younger people in this country in their ability to endure long physical hardship, in their physical fitness and in their strength.

This country is going to move through difficult days, difficult years. The responsibilities upon us are heavy. As the leader of the free world we carry world-wide commitments. People look to us with hope and if we fail they look to those who are our adversaries.

I think during this period we should make every effort to see that the intellectual talents of every boy and girl are developed to the maximum. And that also their physical fitness, their willingness to participate in physical exercise, their willingness to participate in physical contests and athletic contests—all these I think will do a good deal to strengthen this country and also to contribute to a greater enjoyment of life in the years to come.

This is a responsibility which is upon all of us—all of us who are parents—to make sure that we stress this phase of human life and human existence. It is also the responsibility of our schools, and our schools have been doing a great deal to meet this responsibility—of our school administrators and school committees and communities and states.

And also, of course it is a matter of vital interest to our national Government.

To members of school boards, school administrators, teachers, the pupils themselves and their parents, I am directing this urgent call to strengthen all programs which contribute to the physical fitness of our youth.

I strongly urge each school in the United States to adopt the three specific recommendations of our National Council on Youth Fitness:

First, to identify the physically under-developed pupil and work with him to improve his physical capacity. And if he will work and the school will work together, a great deal can be done.

Two, provide a minimum of fifteen minutes of vigorous activity every day for all of our school students, boys and girls alike.

Three, use valid fitness tests to determine pupil physical ability and to evaluate their progress.

The adoption of these recommendations by our schools will insure the beginning of a sound basic program of physical development, exercise and achievement.

I want to urge that this be a matter of great priority. A sound mind in a sound body is one of the oldest slogans of the Western world. I am hopeful that we will place a proper weight on intellectual achievement. But in my judgment, for the long-range happiness and well-being of all of you, for the strengthening of our country, for a more active and vigorous life, that all of you as individuals and as groups will participate in strengthening the physical well-being of young American boys and girls. This is a matter of importance, and I'm hopeful that we can move ahead in the coming months.

Thank you very much.

VA GOES TO CAMPUS IN RECRUITMENT CAMPAIGN

The Veterans Administration, world's largest employer of more than 10 different professions, has gone to the college campus with exhibits to interest young men and women in hard-to-fill jobs. The displays show typically modern VA buildings and people at work and point up professional areas where work opportunities are highest.

VA has just finished college year participation in Federal Career Day programs, beginning early last fall at Duke University and ending at the College of the City of New York. At twelve major universities, VA representatives joined Civil Service Commission and other Federal employers in explaining the career opportunities offered by the government. Beginning this fall, VA hopes to have two exhibits criss-crossing the country and aims to extend its college exhibition coverage to 20 or 30 schools. VA representatives who man the visual exhibit do little actual recruiting on the spot. Their mission, longer in range, is to tell the student of the opportunities offered by the VA.

The VA hires 90 percent of the government's occupational therapists, 72 percent of the medical technicians, 60 percent of the psychologists, and 81 percent of the social workers. Going to the college campus, VA says, is beneficial to the student, the faculty and the agency in not only pointing up job opportunities, but in identifying areas where graduate school or clinical training is required.

NEW PROCEDURE AIDS TB TESTING

An improved method of testing for pulmonary tuberculosis is proving extremely useful at the Minneapolis Veterans Administration Hospital, Dr. James P. Lillehei reported to the recent Research Conference in Pulmonary Diseases held jointly by the VA and Armed Forces. Dr. Lillehei said definite diagnosis of pulmonary TB requires finding TB bacteria in material coughed up from the lungs, or in the case of patients who are unable to cough up sputum, finding the microbes in material obtained by washings from the stomach.

For those who do not raise sputum readily, Dr. Lillehei said inhalation of a warm mist of ordinary table salt and glycerin enables most patients to produce a sputum specimen from the lungs. Tests from 96 patients of the Minneapolis VA hospital show this method is more accurate than examining stomach washings and also is easier and more pleasant for the patient.

The newer method allows the sputum to be examined by direct microscopic study on the day collected, whereas stomach washings provide no information until cultured in the laboratory for several weeks.

Dr. Lillehei is from the pulmonary disease service of the Minneapolis VA hospital and the department of internal medicine of the University of Minnesota School of Medicine.

News and Comments

DR. LEE D. CADY HONORED

The Physician's Award of 1960 by the President's Committee on Employment of the Physically Handicapped will go to a Texas doctor — Dr. Lee D. Cady, manager of the Veterans Administration Hospital at Houston, Tex., it has been announced by Melvin J. Maas, chairman of the President's Committee. The award, given annually to the physician contributing most to the program, will be presented to Dr. Cady at the annual banquet of the Congress of Industrial Health, American Medical Association, at Denver, Colo., October 3, 1961.

"Like most awards," Dr. Cady says, "it really belongs to my associates in Houston and throughout Texas who have loyally sustained the "Employ-the-Handicapped Program — but I'm very happy to represent Texas in its receipt."

Dr. Cady was recommended for the award by Dr. Robert A. Wise, assistant chief physician of the Humble Oil and Refining Company, Houston, and Laurence R. Melton, chairman of the Texas Governor's Committee on Employment of the Handicapped and president of a Dallas printing firm.

Noting that scores of handicapped persons are employed at Houston VA hospital, Dr. Cady said, "We practice what we preach."

Dr. Cady, a native of Missouri and a graduate of the Washington University School of Medicine in St. Louis, has been manager of the Houston VA hospital since it was transferred from the Navy to the VA in April, 1949. During World War II, as a colonel, Dr. Cady commanded the 21st General Hospital through campaigns in Africa, Italy and France. He is a member of the American College of Physicians and is certified by the American Board of Internal Medicine and is a diplomate of the National Board of Medical Examiners. He is the author of more than 30 articles in scientific periodicals.

BOOKS RECEIVED

Selected Papers, Eighth Annual Workshop, Conference of Rehabilitation Centers and Facilities. (Evanston, Ill.: 828 Davis St., 1960, 20 pp. Paper, $1.00.)

Eleven articles by Henry Redkey, Leonard Mayo, Basil J. F. Mott, Dr. Lester A. Gelb, and others are included.

VA PLANS NEW DESIGN IN MODERNIZATION OF FACILITIES

Major changes in hospital design will be incorporated in the Veterans Administration's 12-year, $900,000,000 program for modernization and replacement of its obsolescent hospitals, the VA Chief Medical Director, Dr. William S. Middleton, has announced. Dr. Middleton said the changes will result from progress in care of patients with tuberculosis and psychiatric illness and from the increasing application of automation in medicine.

The trend is away from special hospitals for psychiatric and tuberculous patients and toward the general hospital which can care for these patients as well as general medical and surgical patients. VA has already converted nine of the agency's TB hospitals to general medical and surgical use, and units for treatment of patients with chronic non-tuberculous pulmonary disease have been incorporated into the planning for VA hospitals.

Dr. Middleton said the large psychiatric hospital with its dormitories is a "relic of the past," and even the presently-projected 1000-bed hospitals for the mentally ill appear unwieldy. "Psychiatric units are being planned for VA general medical, surgical, and neurological hospitals, and units of medical, surgical, and neurologic beds are being incorporated in VA psychiatric hospitals," he said. "The early passing of special hospitals can be foreseen, and the future in the VA system will unquestionably witness the evolution of a hospital complex incorporating the several essential elements into a cohesive, well coordinated whole."

VA medicine has only begun to adapt itself to the techniques of automation. The progress will be deliberate to insure that the humanitarian aspects of medical care are maintained.

"From the use of automatic devices to move food, supplies, and records, we will pass to the autoanalyzer and electronic devices for cell counts in the laboratory, to telmetering of temperature, pulse, respiration and blood pressure in the patient at the bedside," Dr. Middleton said. "These are just the beginnings of the inevitable movement toward automation in medicine, which will have major effects on hospital design and construction."

SEEK TO LESSEN NON-PROFESSIONAL NURSING DUTIES

With a nationwide shortage of professional nurses, is their working time being wasted on clerical and other chores that could be done by non-nursing personnel? The Veterans Administration, which operates the nation's largest hospital system, intends to find out. To its 170 hospitals, the agency has sent "fresh-off-the-press" copies of a new VA publication that could revise currently-accepted practices in hospital nursing, to permit nurses to spend more time in direct care of patients.

Entitled "A Guide For Studying The Utilization Of Nursing Service Personnel In VA Hospitals," the volume was developed with the aid of Columbia University, to enable each VA hospital to make a valid study of how it uses — or possibly misuses—its nursing personnel.

Although originated for the VA, the study method could be applied in hospitals generally, since the VA follows the nursing practices that are used throughout the best medical care systems. The VA study method is unique in that it includes a technique for studying appropriateness of activities performed by nursing personnel.

Miss Cecilia H. Hauge, the VA director of nursing in Washington, D. C., said she hopes the Guide will be of value to hospitals outside the VA, as well as to the VA's medical installations. Copies will be available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. The study method has been tested in six VA hospitals, including four general medical and surgical facilities, a tuberculosis hospital, and a hospital for neuropsychiatric patients. The VA nursing personnel utilization study was presented recently at the Federal Nursing Services Program of the convention of the National League for Nursing, in Cleveland, Ohio. This group gave the VA study method a most favorable response.

READMISSION RATE CUT IN V.A. MENTAL HOSPITALS

Major advances are being made in reducing rehospitalization rates of Veterans Administration mental patients, through cooperation of hospitals and community vocational and employment services. Dr. Robert S. Waldrop, director of vocational counseling for the VA Department of Medicine and Surgery in Washington, D. C., said VA hospitals where patients receive these intensive preparatory and follow-up services have reported readmission rates as low as 12 percent, as compared with the 50 percent rate for mental hospitals in the United States generally. Many more VA hospitals are "tooling up" for such programs.

The VA programs are described by Dr. Durand F. Jacobs, research psychologist with the VA's psychiatric evaluation project, Washington, D. C., in a recent article in the *Personnel and Guidance Journal* of the American Personnel and Guidance Association.

VA hospital services to prepare psychiatric patients for employment include the industrial therapy program, in which patients work at part-time, unpaid hospital jobs; the night hospital program, in which patients work or train in the community during the day and return to the hospital at night for treatment the member-employee program, the family care program, and exit wards.

In the member-employee program, the patient is released from patient status but is retained at the hospital as a full-time paid employee for up to one year, to rebuild or strengthen work skills and attitudes.

In the family care program, patients are placed in selected homes to relearn social living skills, which often are essential to their later vocational adjustment.

The exit wards offer concentrated therapeutic, social, and vocational services for patients nearing completion of their hospital stay.

The programs are supplemented by individual and group counseling by VA counseling psychologists and are geared to capitalize upon and extend hospital resources such as physical medicine and rehabilitation, special services, and other physical, pharmacological, and psychological therapies.

Since one of the major contributing factors in producing necessity for rehospitalization of recovered mental patients is their frustration from inability to find and hold a suitable job, the VA also helps its patients secure employment on hospital discharge, either directly or through referral to community agencies.

VA hospitals are fortunate to have in each state the services of VA regional offices, which provide outpatient treatment, trial visit supervision, and support for vocational training.

However, since few veterans are still eligible for or in need of the regional office resources, state agencies such as the U. S. Employment Service, the Division of Vocational Rehabilitation, and others are invited to collaborate with VA hospital personnel in helping the mental patient with his vocational plans and post-hospital adjustment.

At the national level, cooperative agreements have been developed between the VA, the Department of Labor, the Veterans Employment Service, and the Office of Vocational Rehabilitation.

These formal agreements may be modified at the local level to more explicitly outline the activities of those concerned, define the nature of information to be included in referral, progress, and placement reports, and for similar purposes.

VA hospital personnel provide social, psychological, and vocational assistance to former patients, usually through field trips by the social worker or counseling psychologist to the home community of the veteran.

VA counseling psychologists also maintain close liaison with personnel in community agencies such as USES and DVR, with vocational training schools, and frequently with employers of former patients.

Dr. Jacobs' article noted one application of these programs at the Marion, Ind., VA psychiatric hospital, where 90 patients, all with problems particularly likely to cause vocational difficulties, received intensive preparatory and vocational counseling services and were followed up for 26 months.

Average age of the group was 35; one patient was only 19 and the oldest was 61. The periods of their hospitalization ranged from three months to more than 20 years.

Twenty-nine were placed directly in suitable employment by the hospital's counseling psychology staff, and the same number were referred for jobs through an agreement with the Indiana Employment Service.

Fourteen were placed in vocational training through referral to VA regional offices, six were placed in training by the State DVR through cooperative procedures with the VA, and one was placed in training directly by the hospital's counseling psychology service.

Eleven (12.2 percent) were rehospitalized. Of the patients released from the Marion VA hospital during a comparable period, who for one reason or another did not receive these specialized services, 43 percent returned to the hospital.

Dr. Waldrop said the VA is now planning a national program of carefully controlled studies of hospital and community factors which best contribute to the vocational rehabilitation and employment of the mentally ill.

RADIOACTIVE HIPPURAN NEW DIAGNOSTIC AGENT

A new radioactive agent has been developed by Veterans Administration research for use in the diagnosis of kidney disease. Called radioactive hippuran, it is used to differentiate between high blood pressure caused by kidney disease which may be surgically curable and the more common type of high blood pressure of unknown cause for which there is no known cure.

Manuel Tubis, chief biochemist of the radioisotope service at the Los Angeles, Calif., VA center, synthesized the new radioactive agent during the past year, and it has been tested clinically in a large group of patients by W. H. Blahd, M. D., chief of radioisotope service, and R. A. Norodyke, M. D., both of the VA center's staff.

Radioactive hippuran will soon be employed in a nationwide survey of patients with high blood pressure. This survey is being supported by the United States Public Health Service which has granted $100,000 to the National Institutes of Health to conduct the two-year long program.

Pilot studies performed with radioactive hippuran at the VA center in Los Angeles and at UCLA medical school have shown that a 72 percent or higher "cure rate" is possible among those patients with surgically curable high blood pressure resulting from disease of the kidney. It is thought that from 5 to 15 percent of all hypertension victims have this potentially curable type of the disease.

Radioactive hippuran is injected directly into the blood stream. Since this agent is eliminated rapidly and completely by the kidneys, it is possible to measure it with radiation detectors placed over the kidneys. In this way abnormalities of kidney function can be detected.

Because of its safety and simplicity radioactive hippuran can be used to screen all patients with high blood pressure, avoiding the necessity of subjecting all such patients to more complex and unpleasant urological procedures. It is now available commercially for medical use.

NORTHPORT VAH WINS SAFETY CONTEST

The Veterans Administration hospital at Northport, Long Island, N. Y., has won the grand award in the 1960 hospital safety contest sponsored by the American Hospital association and the National Safety Council.

VA hospitals also won first place in three of the eight groups into which contestants were divided according to size; 13 competing VA hospitals finished the year with perfect records; and 17 had the best record in the state in which they operate.

EPILEPSY CONFERENCE SCHEDULED FOR OCTOBER

The 13th annual conference of the Western Institute on Epilepsy will be held from October 11 through the 14th at the Granada Hotel and Inn, San Antonio, Texas. Papers to be presented will deal with the clinical, biochemical, neurophysiologic, psychological and electroencephalographic aspects of epilepsy.

COMPUTER USED FOR SCREENING ECG'S

A milestone in application of electronic data computing to medical diagnosis has been reported by a Veterans Administration physician. Dr. Hubert V. Pipberger of the Mt. Alto VA hospital in Washington, D. C., and Georgetown University School of Medicine said a computer has screened electrocardiograms for heart abnormalities with an average of between 95 and 100 percent accuracy in diagnostic decisions. This is far better than the general average for readings by physicians because both electrocardiograms and vectorcardiograms were used for comparison. The computer can make a much more rapid and detailed study of the heart record than possible by visual analysis. The computer indicated whether the heart records were normal but did not make a specific diagnosis of the sort of heart abnormality present.

The VA research is the first such program in which data collecting, data processing, and diagnostic decision are made entirely by technicians and machines. The physician needs to read and interpret, therefore, only those records which are recognized by the computer as being abnormal.

Dr. Pipberger said records of the electrical output of the hearts of 812 patients of the Mt. Alto VA hospital were fed into the machine.

The research, a joint project of the VA and the National Bureau of Standards, has been under way since 1957.

Heart electrical output records of 2,500 patients of the Mt. Alto VA hospital have been recorded on magnetic tape and converted into numerical form for processing by a computer at the Bureau of Standards. Four other VA hospitals also are participating in the research. Dr. Pipberger is aiming at fuller studies of patients, so that the computer can be used for diagnosis of conditions leading to coronary thrombosis, before the actual heart attack occurs.

The method for application of electronic data computing to the study of heart disease was developed by a group of computer specialists including Dr. H. L. Mason of the computer laboratory of the Bureau of Standards and Allen Berson and Dr. F. W. Stallman of the Mt. Alto VA hospital.

The success of the method indicates that many other records vital to diagnosis also can be converted to forms which can be processed by a computer, Dr Pipberger said. He believes the analog-digital converting equipment developed at the Bureau of Standards may be modified for use in making numerical studies of blood pressure fluctuations and other body functions.

With incorporation of patients' medical histories, clinical test results, symptoms, and other findings, the speed and accuracy of electronics probably can overcome many of the limitations that confront doctors today, he said. Automation, Dr. Pipberger pointed out, can not only accomplish tasks so time-consuming and detailed that they are humanly impossible but can pool the best thinking in medical science.

The VA hospitals participating in the research with the Washington, D. C., hospital are located at Augusta, Ga., Brooklyn, N. Y., Oakland, Calif., and West Roxbury, Mass.

CITE USE OF THIOAMIDE FOR ADVANCED TB

Further considerable decrease in the number of persons hospitalized for tuberculosis might be expected to result from use of a new drug, thioamide, recent research reports to a Veterans Administration-Armed Forces conference indicate. The physicians participating in this meeting, the Research Conference in Pulmonary Diseases of the VA and Armed Forces, compose the group that has conducted large-scale testing of the anti-TB drugs for the entire medical profession since 1946. Dr. James H. Matthews of Washington, D. C., the VA's chief of clinical research in pulmonary diseases, said a multi-hospital VA study shows thioamide is effective for some long-term pulmonary TB patients whose disease had failed to become inactive despite the best previously-known therapy.

Approximately 8,500 tuberculosis patients still remain in VA hospitals, Dr. Matthews said, although mortality and hospitalization rates from TB have decreased drastically during the past seven years.

The VA finding regarding thioamide was confirmed by research conducted by the Clinical Trials Committee of the Research Committee of the British Tuberculosis Association as reported to the conference by a guest speaker, Dr. R. W. Riddell, and also in a report by Drs. Roger S. Mitchell and Thomas L. Petty of the University of Colorado School of Medicine. Dr. Matthews said the VA cooperative study involved 47 previously treated, drug-resistant patients with extremely advanced pulmonary TB and that in 29 percent the disease became non-infectious within four months after administration of thioamide began. This result is significant, he said, although it would not be impressive if it had occurred in patients whose disease was less difficult to treat. Thioamide was introduced into this country by French tuberculosis workers.

The VA now plans to test the drug in combination with streptomycin as a first-line weapon against TB, in patients who have not been treated for the disease with other drugs. The hospitals to participate in this large-scale study have not yet been determined.

Participating in the study reported by Dr. Matthews were the VA hospitals in Albany, Castle Point, and Tupper Lake (Sunmount), N.Y.; Downey, Ill.; Kerrville, Texas; Minneapolis, Minn.; Memphis, Tenn.; Oteen, N.C.; Providence, R.I.; Augusta, Ga.; Butler, Pa.; Livermore and San Fernando Calif.; West Haven, Conn., and Whipple, Ariz.

STUDY SHOWS PSYCHOTICS ARE FREE OF MANY PHYSICAL AILMENTS

Persons with severe mental illness are apparently free of a number of common physical ailments, a 15-year survey of Veterans Administration patients shows. Among hundreds of mentally-ill veterans studied at the Bedford, Mass., VA hospital over the past decade and a half, not a single case of hay fever was discovered and only one case of asthma was found. Rheumatoid arthritis was rare. In addition, many mental patients may not show signs of discomfort or pain during major painful physical disorders. The investigation reveals that most neuropsychiatric patients do not complain of physical pain even with perforation of peptic ulcers, acute appendicitis, and severe heart attacks.

Dr. Walter E. Marchand, chief of the Bedford VA hospital's medical-surgical service, began the study of unusual aspects of the practice of medicine among psychotics in 1946. Dr. Otto F. Ehrentheil, clinical instructor in medicine at Tufts University School of Medicine, joined Dr. Marchand in this study in 1952.

It shows that psychotic patients brought to surgery for acute peritonitis often had suffered the perforation 48 to 72 hours earlier. Autopsy reports disclose that some patients had suffered heart attacks several days before their death and had shown no signs of physical pain. Thus, the study urges, physicians, nurses, and psychiatric aides should be aware of any slight change in the patient's behavior or lapse from his usual routine.

The clues can be subtle; for example, a regularly talkative patient may refuse to chat with nurses or aides. One "ward pacer" was found sitting quietly. Examination showed an acute duodenal ulcer. Another patient who had assisted in ward chores suddenly asked for vacation. He was found to have a heart attack.

Oddly, the taste of medicine will not make the psychotic patient reject it. The mentally ill may swallow the vilest-tasting drugs without fuss or bother.

Mentally-ill diabetic patients often do not understand diet restrictions. One thought doctors were withholding his sugar portion to sell it on the black market. To solve this problem, the Bedford VA hospital brought all its diabetic patients to one ward where the menu was the same for everyone, although the amounts of carbohydrate, fat, and protein were still varied according to each patient's needs.

Dr. Ehrentheil and Dr. Marchand have summed up their findings in a book, *Clinical Medicine and the Psychotic Patient*. Written in an informal narrative fashion, it abounds in observations and practical advice of value not only to psychiatrists but to any physician who undertakes the care of a psychotic patient. The book also is expected to stimulate further research in this area which lies in the no man's land between psychiatry and internal medicine.

JOINT RESEARCH ATTACKS STAPH INFECTION PROBLEM

A multi-faceted research attack to prevent and control drug-resistant staphylococcus and other hospital infections has been launched by the Veterans Administration, with aid of Canadian and other non-VA medical investigators. Separate projects include studies of vaccines, of use of ultraviolet light and microbe-destroying chemicals, and of use of antibiotics. Personnel of nine VA hospitals, two Canadian hospitals, the Georgia Department of Public Health, and Boston City Hospital are participating in the program.

Under joint leadership of Dr. Ralph Vogel of the Atlanta, Ga., VA hospital and Dr. John E. McCroan, assistant director of the Georgia Department of Public Health's Division of Epidemiology in Atlanta, a major study has been undertaken at the Milledgeville, Ga., State Hospital

This project is concerned with enhancement of individual resistance to staphylococcus infection by immunization. Several comparable groups of persons are being tested with vaccines secured from the Pasteur Institute in France and in Siena, Italy. Laboratory work for this study is being done in the laboratories of Dr. Vogel at the Atlanta VA hospital; Dr. Stuart Mudd of the Philadelphia VA hospital; Dr. G. P. Gladstone, a visiting investigator at the National Institutes of Health; and Dr. Lewis Griffith of the Batavia, N. Y., VA hospital.

Another study is underway at the Los Angeles, Calif., VA center under direction of Dr. Sydney Finegold and Dr. William L. Hewitt. This project has been designed to apply to the hospital environment some of the most promising antibacterial measures presently available for this purpose, including ultraviolet light, special air conditioning, and chemical treatment of surfaces and bedclothes. Proper evaluation of these measures, although attempted many times before, has been difficult because of lack of availability of facilities adequate for suitable study on a scale large enough to provide valid information.

The facilities at the Los Angeles VA center are unusually well suited for this purpose. During the past year, the center has completed the design and construction of special air-conditioning equipment, air-sterilizing apparatus, ultraviolet light apparatus, and equipment for introducing into the study the chemicals to be tested. Statistical means have been developed for dealing with the large amount of data which will result from the Los Angeles study, the bacteriology laboratory for the project has been staffed, and many of the methods to be used have been tested and adopted. Now collection of actual data under working conditions of the project is underway.

The reference laboratory headed by Dr. Griffith at Batavia also is supply services for the Los Angeles study. Dr. Griffith's laboratory is the reference laboratory for the entire cooperative study. It provides necessary training and services for VA area reference laboratories established as a result of the program and for special research laboratories.

In addition, Dr. Griffith has underway basic studies of the immunologic characteristics and classification of staphylococci and of reactions affecting development of immunity in vaccinated or infected animals and persons.

The Batavia laboratory also is studying various aspects of drug sensitivity and methods for evaluating it in staphylococci and other microbes. Under direction of Dr Gladys Hobby, a special reference laboratory at the East Orange, N. J., VA hospital is pursuing a broad program of fundamental studies of factors that determine effectiveness and potency of vaccines. This project eventually should provide a sound basis for practical development of more effective vaccines, particularly staphylococcal vaccines.

Dr. William Chardack of the Buffalo, N. Y., VA hospital and Dr. Hobby also are undertaking a study to evaluate immunization versus use of antibiotic drugs as prophylactics against infection Using the two methods of treatment at appropriate intervals prior to surgery, they are studying the effects on the operative and postoperative infection rate.

Dr. Lloyd Rogers of the Syracuse, N.Y., VA hospital and Dr. Vogel are studying the effect of use of nasal antibacterial ointments for surgeons and other operating room personnel, to learn whether this will reduce the occurence of operative and postoperative infections in patients.

Dr. Mudd at the Philadelphia VA hospital is developing special studies relating to infectious diseases, particularly the staphylococcus, and the possibility of enhancing resistance of humans to infection.

LESS TB RESEARCH: MORE STUDY OF OTHER PULMONARY DISEASES

The Veterans Administration announced today it is broadening its large-scale medical research in cooperation with the Armed Forces to recognize the decline of tuberculosis and the growing importance of other pulmonary conditions. This research program has tested the antituberculosis drugs for the entire medical profession since 1946 and has been internationally known as the VA-Armed Forces Cooperative Studies on the Chemotherapy of Tuberculosis. Henceforth, the annual meeting which this group has conducted will be known as the Research Conference in Pulmonary Diseases of the Veterans Administration and Armed Forces.

Dr. William B. Tucker, director of the VA pulmonary disease service in Washington, D. C., said that in recent years, despite substantial decreases in mortality from tuberculosis and certain other respiratory diseases, there have been substantial increases in mortality from pneumonia, emphysema, and cancer of the respiratory system. Respiratory diseases are now the leading cause of disability and the fourth leading cause of death in the United States, he said.

Dr. Tucker stressed that broadening of the VA-Armed Forces research does not mean it will no longer include studies of anti-tuberculosis drugs. He said the group plans to begin in the near future a cooperative study of drug combinations for better treatment of the relatively few pulmonary TB patients for whom highly effective drug therapy is not now available.

However, Dr. Tucker said the studies already include research on histoplasmosis, coccidioidomycosis, and other lung conditions that simulate tuberculosis, and additional studies on respiratory conditions other than TB undoubtedly will be added, perhaps on emphysema, bronchitis, and lung cancer.

CITE BENEFITS OF GARDENING THERAPY

Therapeutic gardening contributes greatly to the recovery of many psychiatric patients of the Veterans Administration's Brentwood Hospital in Los Angeles, according to Lowell Like, manager of the Los Angeles VA Center. In the process, two and one-half acres of former waste land have undergone landscape transformation. More than aesthetic value, said Mr. Like, is the rehabilitation of patients. The patients, with medical guidance, do all the work themselves.

The project over the years has included the building of waterfalls, colorful fish pools, shaded picnic areas, floral displays of rare flowers, a hothouse and a main barbecue area. It has aroused the interest of landscape firms, builders of pools, and lovers of flowers.

Garden therapy is a new approach to long-range patient treatment programs adopted by many hospitals in the country.

Some five years ago, the occupational therapy department of the Physical Medicine and Rehabilitation Service at the Brentwood VA hospital re-evaluated its garden program and decided that a more dynamic one was needed. From a program with about 30 patients from two wards, the garden now offers a rehabilitation program to 130 patients from every ward in the hospital.

TEXAS REHAB ASSOCIATION WILL HOLD SECOND ANNUAL MEETING

The Texas Rehabilitation Association will hold its second annual meeting on August 4 and 5 at the Shamrock Hilton Hotel in Houston. The general theme of the meeting will be "Community Interaction—Key to Rehabilitation." Participants will include national leaders in the field of rehabilitation, physicians, paramedical personnel, nurses, vocational counselors and lay leaders within the community.

VA APPOINTS RESEARCH ADVISORY BOARD

Seven of the nation's top medical leaders will advise the Veterans Administration on its nationwide medical research program, as members of the newly constituted VA Research Advisory Committee.

Chairman of the committee is Dr. Harold Wolff, the Anne Parrish Titzell Professor of Neurology at Cornell University Medical College. Members are Dr. Charles G. Child, Chairman of the Department of Surgery at the University of Michigan Medical School in Ann Arbor; Dr. I. Arthur Mirsky, Professor and Chairman of the Department of Clinical Science at the University of Pittsburgh School of Medicine, Pittsburgh, Pa.; Dr. Harry M. Rose, Chairman of the Department of Microbiology at Columbia University College of Physicians and Surgeons.

Also Dr. Eugene A. Stead, Chairman of the Department of Medicine at Duke University School of Medicine, Durham, N.C.; Dr. Eliot Stellar of the Institute of Neurological Sciences at the School of Medicine of the University of Pennsylvania, Philadelphia; and Dr. Stafford L. Warren, Dean of the University of California at Los Angeles School of Medicine.

The committee represents a consolidation of three groups which advised the VA on its medical research at the national level. These were the previous Advisory Committee on Research, the Advisory Committee on Radiobiology and Radioisotopes, and the Advisory Committee on Problems of Aging.

Dr. Marc J. Musser, director of the VA Research Service in Washington, D.C., said the consolidation was made in recognition of the fact that research in radiobiology and radioisotopes and in aging have become inseparable from medical research in general.

The Advisory Committee on Radiobiology and Radioisotopes, headed by Dr. Shields Warren, Director of the Cancer Research Institute of New England Deaconess Hospital in Boston, had since 1947 guided the VA through the early days of development of atomic medicine, a field in which the VA has pioneered with many major discoveries. Studies using radioisotopes now are found throughout the VA medical research program. Today, the agency's atomic medical personnel and equipment, including a nuclear reactor, constitute one of the nation's outstanding resources in this field, valuable for medical care, research, education, and as a civil defense resource.

The Advisory Committee on Problems of Aging, headed by Dr. Ralph W. Gerard, Professor of Neurophysiology at the University of Michigan, voted itself out of existence. Its members pointed out that assumption of their function by the Advisory Committee on Research would permit that group to direct its attention toward all research from the point of aging whenever that seems to offer an advantage to the VA and would better emphasize the critical importance that aging of the veteran population has to the VA.

NOE'S GRADUATED XERCISORS

SIX MODELS

Resistance from 27 to 200 lbs. Extra light model with 3 lb. minimum resistance for rehabilitation of invalids and hospital patients.

Discount to Hospitals and Doctors.

For free descriptive literature and information, write to:

ROY H. NOE

739 N. Auburndale, Memphis, Tenn.

CITE FOSTER HOME GAINS FOR MENTAL PATIENTS

The Veterans Administration has gained the equivalent of nearly four 600-bed mental hospitals, at no cost to the taxpayer, through placement of recovering mental patients in foster homes during the past ten years. The VA said 2,375 mental patients from its hospitals lived with "adopted" families in private homes near the hospitals during calendar year 1960. This is a 22 percent increase over the number in foster homes in 1959 and more than twice as many as in 1956.

The VA foster home program was begun in 1951. Its aim is to furnish a normal home life for recovering patients. The veterans pay for their room, board, and care from their own funds.

Dr. William S. Middleton, VA's Chief Medical Director, said the foster home program is an outstanding example of the value of community participation in helping victims of mental illness.

Patients are carefully selected by VA doctors and the foster parents and homes are screened by VA social workers.

STILL AVAILABLE

at $1.00 Per Copy

"DIRECTIONAL GOALS FOR CLINICAL THERAPY EXPERIENCES"

Carl Haven Young, Ed.D.

Write

ASSOCIATION FOR PHYSICAL AND MENTAL REHABILITATION

Box 478 — Montrose, N. Y.

Handicapped Drivers!

DRIVE YOUR CAR

—SAFELY

—EASILY

with new improved Mechanical

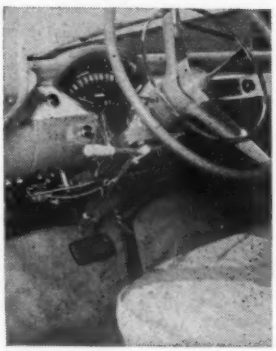
GAS & BRAKE

HAND CONTROLS

$39.50

Plus Postage with copy of this ad

KITS CAN BE INSTALLED IN 2 HOURS



Here's the greatest development in handicapped driver controls. One lever does both operations — works both brake and gas — makes your car absolutely fool-proof. The slightest touch of your fingers now operates your car. Other units selling at more than three times our price cannot give better performance. We guarantee this on a money-back basis. Thirty years' experience in building automatic clutch and brake controls is behind this guarantee. CALL OR WRITE FOR FREE PAMPHLET.

Brake Center, Inc.

Chas. Libby, Pres.

3716 QUEENS BLVD.

LONG ISLAND CITY

NEW YORK

STillwell 4-6417

Classified Directory

Price of Directory Listing for one Year—6 issues—$10.00

STORES WHERE EVEREST AND JENNINGS PRODUCTS MAY BE PURCHASED

Peacock Surgical Co., Inc., 1235 Texas Ave., Shreveport, Lousiana ..... Day 423-5276—Night 868-4910
The Colson-Merriam Co., 1623 N. Aisquith St., Baltimore, Maryland ..... Mulberry 2847
Amsterdam Brothers, 1060 Broad St., Newark 2, New Jersey
E. A. Warnick Co., 123 N. Main St., Wilkes-Barre, Pennsylvania 2-8064
Marvin F. Pollard Co., 411 W. Broad St., Richmond 20, Virginia
Cusack-Harmon Co., 111 So. 17th St., Omaha, Neb. 341-5825

STORES WHERE EVEREST AND JENNINGS PRODUCTS MAY BE RENTED OR PURCHASED

Abbey Rents, 600 S. Normandie Ave., Los Angeles 5, Calif. ..... DU 5-9241; PL 2-3131; RA 3-9571; HO 2-0924; GE 4-0921; TO 6-1714; OX 8-3339; OR 7-6178; CI 3-2101; PO 3-9105; DI 4-7137; OL 2-2760; SY 5-7041; EX 4-3232; KI 6-1181; NA 9-4138
Abbey Rents, 2110 El Cajon Blvd., San Diego 4, Calif. ..... CYpress 7-4101
Abbey Rents, 1314 Post Street, San Francisco 9, Calif. ..... GRaystone—4-2525
Abbey Rents, 2841 S. El Camino Real, San Mateo, Calif. ..... FIreside—5-5775
Abbey Rents, 309 Meridian Road, San Jose, Calif. ..... CYpress 3-1276
Abbey Rents, 2315 Broadway, Oakland, Calif. ..... HIgate 4-8181; ELgin 7-3944
Abbey Rents, 1831 "J" Street, Sacramento 14, Calif. ..... GIlbert—8-9151
Abbey Rents, 1500 N.E. Sandy, Portland 14, Ore. ..... BElmont—4-0274
Abbey Rents, 4111 Aurora Ave., Seattle 3, Wash. ..... MElrose—3-3222
Abbey Rents, 724 W. Indian School Road, Phoenix, Ariz. ..... CRestwood 7-5744
Abbey Rents, 1501 E. Broadway, Tucson, Ariz. ..... MAin 2-8821
Abbey Rents, 1811 S. State Street, Salt Lake City, Utah ..... HUnter 6-7151
Abbey Rents, 350 Broadway, Denver 9, Colo. ..... PEarl—3-5521
Abbey Rents, 4041 Broadway, Kansas City 11, Mo. ..... JEfferson—1-5200
Abbey Rents, 3230 Washington Blvd., St. Louis 3, Mo ..... OL—2-5700; MI—7-3300
Abbey Rents, 2220 Lyndale Ave. S., Minneapolis 5, Minn. ..... FR—4-4680; MI—6-6546
Abbey Rents, 2824 W. Fond du Lac Ave., Milwaukee 10, Wis. ..... UPtown—3-2000
Abbey Rents, 3545 Reading Road, Cincinnati 29, Ohio ..... AVon—1-7000
Abbey Rents, 5326 N. Keystone Ave., Indianapolis 20, Ind. ..... CLifford 3-2741
Best Rentals, 2025 S. Shepherd Drive, Houston 19, Texas ..... JAckson—3-4416
Dowd Chair Rental & Sales, 138 South Highland Ave., Pittsburgh, Pa. ..... MOntrose 1-5355
Dowd Chair Rental & Sales, 4848 Woodward Ave., Detroit 1, Mich. ..... TEmple 3-3490
Dowd Chair Rental & Sales, 310 N. E. 61st St., Miami, 37, Fla. 89-8561
Dowd Chair Rental & Sales, 392 Franklin St., Buffalo, New York ..... CLeveland 3335
Dowd Chair Rental & Sales, (Canada) Ltd., 196 George St., Toronto 2, Ontario, Canada ..... EMpire 6-5405
Medical Arts Supply, 311 State St., S.E., Grand Rapids 3, Mich. ..... GL 9-9413
Elmira Drug & Chemical Co., 368 No. Main St., Elmira, New York 6289
Heyl Physicians Supply Co., 419 State St., Erie, Pennsylvania 2-6785
Bowers Ambulance Service, 430 E. Pacific Coast Highway, Long Beach 6, California ..... HE 6-9703

MANUFACTURERS OF ORTHOPEDIC AND PROSTHETIC APPLIANCES

Birmingham Artificial Limb Co., 519 So. 20th St., Birmingham 3, Alabama 3-1786
Yale Surgical Co., 1004 Grand Ave., New Haven 11, Connecticut ..... State 7-3005
Snell Artificial Limb and Brace Co., Inc., 422 West Market St., Johnson City, Tenn. ..... WA 8-6361

UNCLASSIFIED

National Sports Co., Mfgrs. of Therapy Gym Mats. 360 Marquette St., Fond du Lac, Wisc. ..... WA 1-8200

FORM 3547 REQUESTED
CIRCULATION MANAGER
BOX 478, MONTROSE, N. Y.
RETURN POSTAGE GUARANTEED

BULK RATE
U. S. POSTAGE
PAID
MT. KISCO, N. Y.
PERMIT NO. 222

LaBERNE THE ORIGINAL WALK-OFF STANDING-TILT TABLE

Model 2101 H

LaBERNE ("Walk-Off") tables built of tubular steel and angle iron finished in Silver Grey Meltone, Mounted on swivel casters with locks, Operated through a gear box and worm, automatically locking the table at any degree of tip. From horizontal to vertical with a calibrated dial showing the degree of tip from 0 to 90.

UTILITY MODEL TABLE is 78" long, 28" wide, and 32" high. Foam top covered with Naugahyde, removable footboard, two 6" restrainer straps, and cervical hook.

LaBERNE TABLES FULLY GUARANTEED FOR 1 YEAR.

Hand Operated—UTILITY MODEL 2101 H $239.50

NEW

MAYO MODEL, 24" wide, 32" high, 78" long, foam top covered with Naugahyde, Removable Footboard and two 6" restrainer straps.

MODEL 2122
Price
$375.00

LaBERNE
UTILITY ELECTRIC
MODEL 1060 E
$395.00

NEW

LOW-BOY, 24" high, 24" wide, 72" long. With Telescopic legs, Foam top covered with Naugahyde, removable footboard, two 6" restrainer Straps.

LOW-BOY MODEL 6200 Price $285.00

LaBERNE MANUFACTURING COMPANY, P. O. Box 5245, COLUMBIA, S. C.